Energy levels and branching ratios [93Ma22, 90En08, 98En04]. $^{39}_{20}$Ca

E^* [keV]	$2J^\pi$	C^2S (p,d)	ℓ_n	C^2S (p,d)	C^2S (d,t)	σ (p,d) μb/sr	C^2S (p,d)	C^2S (τ,α)	C^2S (τ,α)	S_N (τ,α)	S_N (τ,α)	S_N (p,d)	$T_{1/2}$ or Γ_{cm}	Ref.
0	3^+	3.74(20)	2	4.2	4.3	3400	2.98	4.3	9.2	8.0	8.0	3.7	859.6(14) ms	75Ap01
2468.7(7)	1^+	1.64(15)	0	1.9	1.5	800		1.58	3.9	3.5	2.9	1.8	161(17) fs	75Ap01
2796.9(5)	7^-	0.14		0.21	0.36	750		0.70					63(17) ps	72Ma23
3026(3)	3^-	0.01		0.005	0.02	45		0.09					21(11) fs	76Do05
3639.8(6)	9^-					38							17(10) ps	
3825(3)				0.04	0.01								145(55) fs	76Do05
3869.8(9)													2.6(9) ps	
3890.4(12)													<26 ps	
3935.5(7)				0.006	0.01	160							<65 fs	76Do05
3952.8(14)				incl	incl	incl							0.8(3) ps	
4021.6(9)	1^+	0.097		0.09	0.07			0.11					0.42(12) ps	93Ma22
4320(20)					0.05									76Do05
4432(20)	5^+	0.033			0.1									93Ma22
4487(20)	7^-	0.01												93Ma22
4610(20)														98En04
4710(20)														98En04
4926(20)	$\langle 5^+ \rangle$	0.045			0.05									93Ma22
5070(20)														98En04
5128(20)	5^+	1.027		1.0	0.97	1050		1.70		3.9	3.2	1.4		93Ma22
5222(20)	5^+	0.076												93Ma22
5316(20)	7^-	0.02			0.16									93Ma22
5364(20)	5^-,7^-													93Ma22
5400(20)														93Ma22
5484(20)	5^+	0.490		0.45	0.46	550		1.26						93Ma22
5588(20)	$\langle 5^+ \rangle$	0.033												93Ma22
5673(20)	$\langle 5^+ \rangle$	0.016												93Ma22
5720(20)	$\langle 7^- \rangle$	0.01												93Ma22
5760(20)														98En04
5790(20)	3^-	0.01			0.03									93Ma22
5851(20)	3^-	0.002												93Ma22
6009(20)	$\langle 7^- \rangle$	0.03			0.02									93Ma22
6094(20)	$\langle 1^+ \rangle$	0.038												93Ma22
6158(20)	5^+	0.94		1.1	0.98	900		1.94		4.4	3.6	1.5		93Ma22
6286	5^+	0.044												93Ma22
6405	$\langle 7^- \rangle$	0.03				310								93Ma22
6467	5^+	0.079			0.25	incl								93Ma22
6514	$\langle 5^+ \rangle$	0.038												93Ma22
6580	$\langle 7^- \rangle$	0.01												93Ma22
6629														93Ma22
6722	$\langle 7^- \rangle$	0.01												93Ma22
6794	5^+	0.056		0.04	0.09									93Ma22
6835														93Ma22
6906	1^+	0.01			0.09	150								93Ma22
6954	$\langle 5^-$,$7^- \rangle$													93Ma22
7025	$\langle 5^- \rangle$													93Ma22

(continued) **$^{39}_{20}$Ca**

E^* [keV]	$2J^\pi$	C^2S (p,d)	ℓ_n	C^2S (p,d)	C^2S (d,t)	σ (p,d) μb/sr	C^2S (p,d)	C^2S (τ,α)	C^2S (τ,α)	S_N (τ,α)	S_N (τ,α)	S_N (p,d)	$T_{1/2}$ or Γ_{cm}	Ref.
7060														93Ma22
7132	5^+	0.046												93Ma22
7199	5^+	0.197		0.21	0.25	290								93Ma22
7248	5^+	0.036												93Ma22
7310	$\langle 5^-,7^-\rangle$													93Ma22
7380	5^+	0.121		0.10	0.14									93Ma22
7427	$\langle 5^+\rangle$	0.018												93Ma22
7480	$\langle 5^-,7^-\rangle$													93Ma22
7532	$\langle 5^-,7^-\rangle$				[0.1]	100								93Ma22
7581	$\langle 5^-,7^-\rangle$													93Ma22
7635	$\langle 5^-,7^-\rangle$													93Ma22
7711	5^+	0.046			0.1									93Ma22
7773														93Ma22
7840														93Ma22
7924	5^+	0.104		0.33										93Ma22
7972	5^+	0.231		incl	0.37	430								93Ma22
8021	$\langle 5^+\rangle$	0.041			incl									93Ma22
8082	$\langle 5^+\rangle$	0.031												93Ma22
8157	5^+	0.112			0.16									93Ma22
8219	5^+	0.078												93Ma22
8280	$\langle 5^+\rangle$	0.026												93Ma22
8336	5^+	0.142			0.28	330								93Ma22
8396	$\langle 5^+\rangle$	0.023												93Ma22
8460	$\langle 5^+\rangle$	0.052												93Ma22
8509	5^+	0.071			0.2									93Ma22
8582	$\langle 5^+\rangle$	0.035												93Ma22
8650	$\langle 5^+\rangle$	0.019												93Ma22
8692	5^+	0.106			0.25	210								93Ma22
8748	$\langle 5^+\rangle$	0.025												93Ma22
8806	$\langle 5^+\rangle$	0.030												93Ma22
8895					0.17									93Ma22
8937	5^+	0.032												93Ma22
8988	5^+	0.038												93Ma22
9039	5^+	0.052			0.18	150								93Ma22
9104	$\langle 5^+\rangle$	0.017												93Ma22
9158	5^+	0.037												93Ma22
9213	$\langle 5^+\rangle$	0.026			0.13									93Ma22
9271					0.1									93Ma22
9329														93Ma22
9426														93Ma22
9505					0.06									93Ma22

(continued) **$^{39}_{20}$Ca**

E^*	$2J^\pi$	C^2S	ℓ_n	C^2S	C^2S	σ (p,d)	C^2S	C^2S	C^2S	S_N	S_N	S_N	$T_{1/2}$ or	Ref.
[keV]		(p,d)		(p,d)	(d,t)	μb/sr	(p,d)	(τ,α)	(τ,α)	(τ,α)	(τ,α)	(p,d)	Γ_{cm}	
		93Ma22		72Ma23	76Do05	75Ka10			75Ap01		80Lu03			Ref.
										80Lu03		80Lu03		Ref.

Additional data on this isotope can be found in [86Vi02, 84Ra22, 73BoXR, 68Ly01, 66Ej01].

High energy resolution measurements [93Ma22] of the (p,d)-reaction at 5°-45° were resulted in the values C^2S given here at left. Comparison of the earlier data can be found in [75Ka10].

C^2S values obtained during the study of other one-neutron pickup reactions (p,d) [76Do05] and (τ,α) [75Ap01] are given in the center.

For three low-lying states (J^π=3/2$^+$, 1/2$^+$, 7/2$^-$) the parameter C^2S from neutron pickup reactions (p,d) and (d,t) was found to be close to the theoretically expected values 4.0, 2.0 and 0.0 [71Ra35, 75Ap01].

Energy levels and branching ratios [93Ma22, 90En08, 98En04]. Part 2 **$^{39}_{20}$Ca**

E^*	$2J^\pi$	Branching ratios in percentage			
		E^*_f:	0	2469	2797	3026
[keV]		$2J^\pi_f$:	3$^+$	1$^+$	7$^-$	3$^-$
2468.7(7)	1$^+$		100			
2796.9(5)	7$^-$		100			
3026(3)	3$^-$		100			
3639.8(6)	9$^-$		25(10)		75(10)	
3825(3)			x			x
3869.8(9)			x			
3890.4(12)					x	
3935.5(7)			x			
3952.8(14)					x	
4021.6(9)	1$^+$			80(10)		20(10)

Energy levels and branching ratios [90En08, 98En04, 04Ca38, 77En02] **$^{40}_{20}$Ca**

E^*	J^π	T	ℓ_p	S'^+_p	ℓ_n	S^-_n	L	σ (p,t)	σ (p,t)	σ (τ,n)	S_α	S_α	$\Gamma_\circ$	$B(E2)$	Ref.
[keV]				eval		eval	(p,t)	mb	*rel.*	μb/sr	*rel.*	(^{6}Li,d)	[meV]		
0	0$^+$		2	4.6**	3	0.85(9)	0	64	100	1400	1.9	0.30			77En02
3352.62(9)	0$^+$		2	<0.7	3	0.01(1)	0	14.3	24.0	80	1.5	0.21			77En02
3736.69(5)	3$^-$		1	0.01(1)	0	0.16(4)	3	13.9			1.0	0.06			77En02
			3	0.55(6)	2	0.5(1)									77En02
3904.38(3)	2$^+$		2	<0.2	1,3		2	8.1		150	1.0	0.26	15.7(43)	108(29)	77En02
4491.43(4)	5$^-$		3	0.84(9)	2	1.0(2)	5	4.6			2.2	0.016			77En02
5211.6(2)	0$^+$						0	0.03	0.5		0.18	0.18			74Se05

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	T	ℓ_p	S'^+_p eval	ℓ_n	S^-_n eval	L (p,t)	σ (p,t) mb	σ (p,t) *rel.*	σ (τ,n) μb/sr	S_α *rel.*	S_α (^{6}Li,d)	$\Gamma_\circ$ [meV]	$B(E2)$	Ref.
5248.79(5)	2^+						2	7.1			<0.02	0.18	4.6(5)	7.1(8)	02Ha13
5278.80(6)	4^+										0.61	0.19			
5613.52(3)	4^-		3	0.9(1)	2	0.8(1)	2	0.83							77En02
5629.41(6)	2^+										0.19	0.05	14.0(13)	15.4(14)	02Ha13
5902.63(7)	1^-		1	0.05(2)	2		1	0.28			0.33	0.03	33(4)	0.46(5)*	77En02
			3	<0.1											77En02
6025.47(5)	2^-		1	0.05(2)	2	0.14(4)		0.62							77En02
			3	0.24(4)											77En02
6029.71(6)	3^+		1	0.50(7)	0										77En02
			3	<0.1	2	0.05(2)									77En02
6160	$\langle 3^- \rangle$														04Ca38
6285.15(4)	3^-						3	0.54			0.91	0.026			02SeZQ
6422.4(10)	2^+												27(7)	0.29(8)	02Ha13
6507.9(1)	4^+						4	1.53			0.08	0.030			02SeZQ
6542.80(9)	4^+										0.10	0.036			
6582.5(1)	3^-		1	0.18(2)	0	0.04(1)	3	2.13			<0.15	0.087			77En02
			3	<0.2	2	0.24(4)									77En02
6750.41(7)	2^-		1	0.16(2)	2	0.20(4)	$\langle 2 \rangle$	0.44							77En02
			3	0.44(8)											77En02
6908.70(8)	2^+						2	1.87			<0.36	0.12	221(36)	87(14)	02Ha13
6930.2(3)	6^+										$\langle 0.9 \rangle$	0.25			04Ca38
6931.29(6)	3^-														04Ca38
6938.0(18)	1^-–5^-														
6950.48(7)	1^-		1	0.40(7)	2	0.06(2)	1	0.95		200			489(71)	4.2(6)*	77En02
			3	<0.5											77En02
7100	$\langle 2^+ \rangle$														04Ca38
7113.1(10)	1^-														
7113.73(5)	4^-						$\langle 3 \rangle$	0.79							02SeZQ
7239.07(8)	3^-–5^-														
7277.82(8)	$\langle 2,3 \rangle^+$														
7300.67(11)	0^+						0	0.42	0.6						74Se05
7397(1)	$\langle 5^+ \rangle$														
7421.9(15)	2^+–6^+						$\langle 2 \rangle$	0.30							02SeZQ
7446.23(6)	$\langle 3,4 \rangle^+$														
7466.35(7)	2^+						2	0.89				0.04			02SeZQ
7532.26(5)	2^-														
7561.17(7)	4^+						$\langle 2 \rangle$	2.68				0.04			04Ca38
7623.11(8)	2^-–4^+						0	1.21							02SeZQ
7658.23(5)	4^-	1						0.53							02SeZQ
7676.6(5)	$\langle 6^+ \rangle$														
7694.08(4)	3^-	1													
7701.8(4)	0^+						0	3.0	5.3	100		0.18			74Se05
7769.4(10)	$\langle 3$–$5^- \rangle$							0.06							02SeZQ
7814.7(6)	0^+							0.08							02SeZQ
7870	$\langle 3^- \rangle$											0.066			04Ca38

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	T	ℓ_p	S'^+_p eval	ℓ_n	S^-_n eval	L (p,t)	σ (p,t) mb	σ (p,t) *rel.*	σ (τ,n) μb/sr	S_α *rel.*	S_α (^{6}Li,d)	$\Gamma_\circ$ [meV]	$B(E2)$	Ref.
7872.18(9)	2^+						2	0.64					176(32)	36(7)	02Ha13
7928.42(10)	4^+						⟨3⟩	0.76							02SeZQ
7972.5	$\leq 3^-$														04Ca38
7974.4(8)	$\langle 6^+ \rangle$														
7976.55(3)	2^+							0.26							02SeZQ
8018.8(10)	0^+						0	0.22							02SeZQ
8051.8(6)												0.15			
8091.61(17)	2^+						4	1.05		160			166(16)	30(3)	02Ha13
8098.9(7)	8^+														
8113.2(5)	$1^{\langle - \rangle}$											0.21	25(9)	0.13(5)*	02Ha13
8134.77(10)	$\langle 2\text{–}4^+ \rangle$														
8187.5(8)	$\langle 3\text{–}5^- \rangle$														
8195.9(6)							⟨2⟩	0.59							02SeZQ
8271(1)	$\langle 0\text{–}3 \rangle^-$														
8276(1)	0^+						0	0.29	0.3	560		0.055			02SeZQ
8323.16(8)	$\langle 1^-,2^+ \rangle$														
8338.0(3)	$\langle 2^+\text{–}5^- \rangle$							0.26							02SeZQ
8358.9(6)	$\langle 0\text{–}2 \rangle^-$														
8364(5)	$3^-\text{–}7^-$														04Ca38
8373.94(15)	4^+						4	0.95				0.043			02SeZQ
8424.81(11)	2^-	1													
8439.0(5)	0^+						0	1.40	2.6						74Se05
8484.02(13)	0^+						0	0.28		530					02SeZQ
8540(4)	$1,2^+$														
8551.1(7)	5^-	1					5	3.2				0.08			02SeZQ
8578.80(9)	2^+							0.57					161(13)	22(2)	02SeZQ
8587(2)	$2^+,3$											0.11			
8631(5)															
8665.3(8)	1^-														
8678.29(10)	4^+						4	0.18							02SeZQ
8701(1)	6^-														04Ca38
8717(8)															04Ca38
8748.22(9)	2^+											0.11	88(10)	11(1)	02Ha13
8764.18(6)	3^-						3	0.28							02SeZQ
8810(7)	$\langle 2^+ \rangle$														04Ca38
8850.6(9)	$\langle 6\text{–}8 \rangle^-$							0.18							02SeZQ
8909.0(9)							⟨6⟩	0.48							02SeZQ
8934.81(7)	2^+											0.14			94Ya04
8935.8(9)	$\langle 7^+ \rangle$														
8938.4(9)	0^+						0	0.19							02SeZQ
8980(5)	$\langle 5\text{–}7 \rangle^+$														
8982.5(5)	2^+												148(15)	16(2)	04Ca38
8994.50(11)	$\langle 1^-,2^+ \rangle$														
9031.9(3)	4^-							1.22							02SeZQ
9050.1(10)															

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	T	ℓ_p	S'^+_p eval	ℓ_n	S^-_n eval	L (p,t)	σ (p,t) mb	σ (p,t) *rel.*	σ (τ,n) μb/sr	S_α *rel.*	S_α (^{6}Li,d)	$\Gamma_\circ$ [meV]	$B(E2)$	Ref.
9080.3(11)															
9091.70(6)	3^-	$\langle 0 \rangle$													
9135.66(5)	$\langle 3 \rangle^-$	0										[0.2]			94Ya04
9162.1(11)								0.46							02SeZQ
9185.3(12)															
9209.77(5)	$\langle 2,3 \rangle^-$	0													
9226.69(5)	$\langle 1^- – 3^- \rangle$														
9227.43(7)	$\langle 1,2^+ \rangle$														
9240	6^+											0.11			94Ya04
9246.0(12)	$\langle 6–8 \rangle^-$							0.12							02SeZQ
9274.5(12)							$\langle 2 \rangle$	0.31							02SeZQ
9304(5)	0^+						0	0.52							02SeZQ
9305.2(8)	$\langle 8^+ \rangle$														
9362.54(6)	3^-	0								400		0.10			94Ya04
9377.8(2)							2	0.55							02SeZQ
9388.20(19)	2^+														
9395.7(3)	$\langle 3^-,4^+ \rangle$														
9404.85(19)	2^-	1													
9406.4(6)	0^+	1					0	3.8	7.9						74Se05
9412.4(2)															
9418.8(2)	3^-	1													
9429.11(5)	$\langle 3,4 \rangle^-$	0													
9432.46(18)	1^-	1													
9453.95(5)	3^-	0													
9500.0(15)	$\langle 2^+ \rangle$											0.10			94Ya04
9536.35(16)	$\langle 3,4 \rangle^+$														
9537.9(5)	1^-														
9564(5)	2^+	$\langle 1 \rangle$						0.13		240					02SeZQ
9603.0(4)	3^-	1													
9604.6(4)	1^-	1													
9640.89(7)	2^-	1													
9655.6(9)	$\langle 1,2^+ \rangle$														
9662.3(2)	$\langle 0–3 \rangle^-$														
9668.71(8)	3^-	1						0.88				0.20			94Ya04
9779.47(7)	3	1													
9785.3(2)	$\langle 1,2^+ \rangle$														
9802.2(7)	$\langle 1–3 \rangle^-$														
9811.1(2)	$\langle 3–5^- \rangle$														
9829.54(16)	$\langle 1^- – 4^+ \rangle$														
9835.08(19)	$\langle 2^+ – 5^- \rangle$														
9853.5(8)	$\langle 8^+ \rangle$														04Ca38
9854.54(17)	$\langle 1–3 \rangle^-$														
9859.7(3)	$\langle 4–6 \rangle^-$														
9865.15(11)	1	1											3600(1450)		82Mo05
9869.3(4)	1^+														04Ca38

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	T	ℓ_p	S'^+_p eval	ℓ_n	S^-_n eval	L (p,t)	σ (p,t) mb	σ (p,t) *rel.*	σ (τ,n) μb/sr	S_α *rel.*	S_α (^{6}Li,d)	$\Gamma_\circ$ [meV]	$B(E2)$	Ref.
9870	$[2^+]$											0.14			94Ya04
9898.6(3)															
9921.4(2)	$\langle 3–5^-\rangle$														
9939.8(2)															
9950	$[1^-,5^-]$											0.03			94Ya04
9954.00(9)	4^+	0													
9977.20(17)	$\langle 3–5\rangle$														
9993.71(5)															
10040.54(9)	$\langle 2^-,3^-\rangle$	1													
10045.7(5)	$\langle 3^–7^-\rangle$														
10049.38(7)	4^-	1													
10058.0(3)															
10065(2)	$\langle 1^-,2^+\rangle$	0										0.20			94Ya04
10080.7(2)															
10130.70(19)	$\langle 3^-,4^+\rangle$	0													
10154(7)	$3^–5^-$	0										0.06			94Ya04
10193(7)	$3^–5^-$	0													
10199.2(4)	$\langle 1^-\rangle$	0													
10205.1(8)															
10210.6(2)	$\langle 3,4\rangle^-$														
10232.8(7)															
10262.53(10)	3^-	0+1													
10267.7(5)	1^-	0													04Ca38
10274.8(3)	$\langle 3–5\rangle^+$														
10277.9(2)	$\langle 1^-\rangle$	0													
10285.0(3)	1^-														04Ca38
10319(1)***	1^+	1											5500(800)		82Mo05
10333.7(5)	3^-	0													04Ca38
10340	$[8^+]$											0.25			94Ya04
10358.6(15)															
10361.5(15)	3^-	0													
10362.6(5)	1^-														04Ca38
10364.6(5)	1^-														04Ca38
10376.6(5)	1^-														04Ca38
10383.90(16)	$\langle 1^-,2^+\rangle$	0													
10415.06(6)	3	1													
10420.2(5)	1^-	0													04Ca38
10430.58(19)	N	0													
10443.4(5)	2^-														04Ca38
10443.9(2)	3^-	0													
10446.8(5)	1^-														04Ca38
10470.0(15)	$\langle 3,5\rangle^-$	0													
10474(2)															
10478.7(1)															
10503.1(15)	$\langle 3,4,5\rangle^-$														

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	T	ℓ_p	S'^+_p eval	ℓ_n	S^-_n eval	L (p,t)	σ (p,t) mb	σ (p,t) *rel.*	σ (τ,n) μb/sr	S_α *rel.*	S_α (^{6}Li,d)	$\Gamma_\circ$ [meV]	$B(E2)$	Ref.
10514.8(15)	3^-,4^+,5^-	0													
10516.3(5)															04Ca38
10529.6(5)	$\langle 1^+ \rangle$														04Ca38
10541.5(5)	0^+	0													04Ca38
10552.2(15)															
10583(5)	$\langle 3,4,5 \rangle$														
10596.2(5)	3^-	0										0.10			94Ya04
10598.4(5)	$\langle 1^+ \rangle$														04Ca38
10607.4(5)	$0^{\langle + \rangle}$														04Ca38
10618.6(5)	2^-														04Ca38
10621.4(5)	0^+	0													04Ca38
10633.6(5)	$\langle 1^- \rangle$														04Ca38
10639.07(7)	$\langle 3^- – 5^- \rangle$	1													
10646.4(4)	N	0													
10653.23(16)	$\langle 1^- – 4^+ \rangle$														
10657.4(5)	2^+	0													
10666.4(5)	2^-														04Ca38
10670.4(3)	1^-														
10673.69(17)	$\langle 2^- \rangle$														04Ca38
10676.4(5)	1^-	0										0.28			94Ya04
10691.0(3)	2^+														
10699.50(10)	3														
10700.9(5)	0^+														04Ca38
10720.8(3)	$\langle 3,5 \rangle^-$	0													
10722.1(5)	1^+														
10737.7(3)	1^-	0+1													
10740.1(5)	1^-														04Ca38
10747.8(4)	4^+	0													
10748.8(5)	0^+														04Ca38
10753.85(18)	$\langle 3,4,5 \rangle$														
10770.2(3)	$\langle 1^+ \rangle$														04Ca38
10776.3(3)	3^-	0													
10780.5(5)	$\langle 3^- \rangle$														04Ca38
10780.9(3)	2^+	0													
10783.1(5)	$\langle 0^- \rangle$														
10787.7(3)															
10800.0(10)	$\langle 1^-,2^+ \rangle$	0													
10802.6(5)	$0^{\langle + \rangle}$														04Ca38
10813.7(5)	3^-,4^+,5^-	0										0.14			94Ya04
10816.2(5)	2^-														04Ca38
10816.4(5)	3^+														04Ca38
10830.6(6)	N	0													
10833.0(5)	$3^{\langle - \rangle}$														04Ca38
10848.5(4)	$\langle 3,5 \rangle^-$	0													
10849.2(5)	2^-														04Ca38

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	T	ℓ_p	S'^+_p eval	ℓ_n	S^-_n eval	L (p,t)	σ (p,t) mb	σ (p,t) *rel.*	σ (τ,n) μb/sr	S_α *rel.*	S_α (^{6}Li,d)	$\Gamma_\circ$ [meV]	$B(E2)$	Ref.
10852.0(5)	$\langle 1^-,2^-\rangle$														04Ca38
10861.3(5)	2^+	0													04Ca38
10868.9(5)	1^-														04Ca38
10869.5(5)	0^+														04Ca38
10873.7(5)	1^-														04Ca38
10895(1)	$\langle 9^-\rangle$														04Ca38
10899.1(5)	1^+														04Ca38
10910.0(4)	$\langle 3$–$5\rangle$	0										0.11			94Ya04
10914.6(5)	1^-														04Ca38
10915.6(5)	3^+														04Ca38
10921.1(4)	$\langle 2^+$–$4^+\rangle$														
10932.5(5)	1^-	0													04Ca38
10933.2(5)	2^-														04Ca38
10946.8(5)	2^+	0													
10950.7(5)	1^-	0													
10953.4(5)	$0^{\langle+\rangle}$								12						74Se05
10956.0(4)	$3^-,4^+,5^-$	0													
10976.3(15)	$\langle 3,4,5\rangle$														
10988.0(4)	$3^-,4^+,5^-$	0													
10988.5(5)	2^-														04Ca38
10989.2(5)	$\langle 1^+\rangle$														04Ca38
10994.7(4)	$\langle 1^-\rangle$														
10998.7(5)	$1^-,3^-$														04Ca38
11002.4(5)	$\langle 1,3\rangle^-$	0													
11003.0(9)	$\langle 10^+\rangle$														
11007.0(5)	1^-														04Ca38
11011.0(4)	3^-	0+1													
11024.0(5)	$\langle 1^-,3^-\rangle$	0													
11036.1(5)	$\langle 1^+\rangle$														04Ca38
11038(7)	$\langle 3,4,5\rangle$														
11044.3(5)	2^+	0													
11070.6(4)	$\langle 1^-$–$4^+\rangle$														
11073.3(5)	2^+														04Ca38
11078.2(5)	1^-	0													
11083.4(5)	$\langle 1^+\rangle$														04Ca38
11087(3)	$\langle 3^-,4^+\rangle$	0													
11089.1(5)	$0^{\langle+\rangle}$											0.60			94Ya04
11106.8(5)	1^-														04Ca38
11118.8(5)	2^+														04Ca38
11128.9(5)	4^+	0													04Ca38
11143(6)	$\langle 3,4,5\rangle^-$														
11145.0(5)	$1^{\langle-\rangle}$														04Ca38
11145.6(5)	1^+														04Ca38
11157.0(5)	2^-														
11161.3(5)	4^+	0													

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	T	ℓ_p	$S_p'^+$ eval	ℓ_n	S_n^- eval	L (p,t)	σ (p,t) mb	σ (p,t) *rel.*	σ (τ,n) μb/sr	S_α *rel.*	S_α (^{6}Li,d)	$\Gamma_\circ$ [meV]	$B(E2)$	Ref.
11162.7(5)	2^+														04Ca38
11167.2(5)	4^+	0													04Ca38
11187.4(5)	3^-														04Ca38
11202.7(5)	$\langle 3\rangle^-$	0													04Ca38
11210	$\langle 0^+\rangle$											0.62			94Ya04
11212.4(5)	3^-														04Ca38
11217(3)	3^-														
11217.6(5)	4^+														04Ca38
11231.2(5)	2^-														04Ca38
11236(3)	1^-														
11246.6(5)	3^-	0													04Ca38
11255.7(5)	1^+														04Ca38
11260.6(5)	$\langle 0^-\rangle$														04Ca38
11264.2(5)	2^+	0													04Ca38
11284.1(5)	$\langle 2^-\rangle$														04Ca38
11289.6(5)	1^+														04Ca38
11300.1(5)	1^+														04Ca38
11302.3(5)	$\langle 1^-\rangle$														04Ca38
11311(4)	3^-,4^+,5^-	0										0.40			94Ya04
11319.8(5)	$\langle 0^-\rangle$														04Ca38
11321.8(5)	2^+	0													04Ca38
11329.1(5)	2^+														04Ca38
11330.5(5)	1^-	0													04Ca38
11338.5(5)	$\langle 1^+\rangle$														04Ca38
11346.2(5)	$4^{\langle +\rangle}$	0													04Ca38
11351.3(5)	1^+														04Ca38
11362.2(5)	1^+														04Ca38
11365.8(5)	2^+	0													04Ca38
11366.8(5)	2^-														04Ca38
11368.1(5)	$4^{\langle +\rangle}$														04Ca38
11370	$\langle 5^-\rangle$											0.12			94Ya04
11371.2(5)	2^+														04Ca38
11381.9(5)	2^+	0													04Ca38
11392.8(5)	$1^{\langle -\rangle}$														04Ca38
11404.0(5)	1^-	0													04Ca38
11406.8(5)	1^+														04Ca38
11414.6(5)	4^+	0													04Ca38
11420.1(5)	3^-														04Ca38
11432.5(5)	1^-	0													04Ca38
11436.6(5)	2^+	0													04Ca38
11447.0(5)	1^-	0													04Ca38
11451.2(5)	1^+														04Ca38
11455.2(5)	3^-	0													04Ca38
11460.2(5)	2^+	0													04Ca38
11464.9(5)	$2^{\langle +\rangle}$														04Ca38

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	T	ℓ_p	$S_p'^+$ eval	ℓ_n	S_n^- eval	L (p,t)	σ (p,t) mb	σ (p,t) *rel.*	σ (τ,n) μb/sr	S_α *rel.*	S_α (^{6}Li,d)	$\Gamma_\circ$ [meV]	$B(E2)$	Ref.
11468(3)	3^-,4^+,5^-	0										0.12			94Ya04
11468.5(5)	2^-														04Ca38
11479.6(5)	1^+														04Ca38
11486.5(5)	0^+														04Ca38
11489.4(5)	1^+														04Ca38
11513.4(5)	2^+														04Ca38
11515.0(5)	$1^{\langle-\rangle}$														04Ca38
11518.8(5)	2^+														04Ca38
11537.7(5)	2^-														04Ca38
11542.0(5)	2^+														04Ca38
11543.5(5)	$\langle1^+\rangle$														04Ca38
11546.5(5)	2^-														04Ca38
11549(5)	$\langle3,5\rangle^-$	0													
11554.3(5)	1^-														04Ca38
11558.9(5)	$\langle2^+\rangle$														04Ca38
11563.3(5)	$\langle2^-\rangle$														04Ca38
11577.7(5)	2^-														04Ca38
11577.8(5)	2^+														04Ca38
11585.4(5)	2^-														04Ca38
11597.0(5)	$\langle2^+\rangle$														04Ca38
11602.1(5)	2^+														04Ca38
11603.2(5)	2^+														04Ca38
11605.1(5)	1^-														04Ca38
11610.9(5)	1^-														04Ca38
11613.8(5)	$\langle2^-\rangle$														04Ca38
11617(10)	$\langle3,4,5\rangle$														
11628.3(5)	$\langle3^+\rangle$														04Ca38
11628.9(5)	2^+														04Ca38
11637.9(5)	1^-														04Ca38
11644.8(5)	$\langle2^-\rangle$														04Ca38
11646.7(5)	2^+														04Ca38
11650.6(5)	$2^{\langle+\rangle}$														04Ca38
11652.0(5)	3^-														04Ca38
11653.3(5)	2^+														04Ca38
11661.5(5)	1^-														04Ca38
11663(6)	3^-,4^+,5^-	0													04Ca38
11672.6(5)	$\langle2^-\rangle$														04Ca38
11676.9(5)	2^+														04Ca38
11685.8(9)	$\langle10^+\rangle$														
11687.9(5)	$\langle1^+\rangle$														04Ca38
11689.0(5)	$\langle2^-\rangle$														04Ca38
11690	$\langle7^-\rangle$											0.10			94Ya04
11692.6(5)	$4^{\langle+\rangle}$														04Ca38
11696.1(5)	$0^{\langle-\rangle}$														04Ca38
11703.4(5)	0^+														04Ca38

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	T	ℓ_p	S'^+_p eval	ℓ_n	S^-_n eval	L (p,t)	σ (p,t) mb	σ (p,t) *rel.*	σ (τ,n) μb/sr	S_α *rel.*	S_α (^{6}Li,d)	$\Gamma_\circ$ [meV]	$B(E2)$	Ref.
11704.4(5)	2^-														04Ca38
11707.6(5)	1^-														04Ca38
11708.7(12)	$\langle 9^+ \rangle$														04Ca38
11713.4(5)	1^+														04Ca38
11715.5(5)	2^-														04Ca38
11721.0(5)	1^+														04Ca38
11723.9(5)	$3^{\langle - \rangle}$														04Ca38
11726(5)	$\langle 3,5 \rangle^-$	0													
11730.8(5)	$1^{\langle - \rangle}$														04Ca38
11730.9(5)	1^+														04Ca38
11738.6(5)	2^+														04Ca38
11742.6(5)	4^+														04Ca38
11744.4(5)	$1^{\langle - \rangle}$														04Ca38
11749.3(5)	2^-														04Ca38
11753.2(5)	3^-														04Ca38
11753.8(5)	1^+														04Ca38
11757.1(5)	2^-														04Ca38
11767.8(5)	$3^{\langle - \rangle}$														04Ca38
11775	$\langle 1^+ \rangle$														04Ca38
11782.4(5)	$3^{\langle - \rangle}$														04Ca38
11788.3(5)	2^+														04Ca38
11792.2(5)	1^+														04Ca38
11799.0(5)	$4^{\langle + \rangle}$														04Ca38
11800	$[5^-]$											0.08			94Ya04
11803.9(5)	0^+														04Ca38
11808.9(5)	$\langle 1^+ \rangle$														04Ca38
11810.7(5)	2^+														04Ca38
11811.4(5)	3^-														04Ca38
11820.4(5)	3^-														04Ca38
11830.6(5)	2^+														04Ca38
11839.0(5)	0^+														04Ca38
11841(6)	3^-,4^+,5^-	0													
11843.9(5)	1^+														04Ca38
11855.6(5)	2^+														04Ca38
11857.1(5)	$\langle 1^+ \rangle$														04Ca38
11863.1(5)	$\langle 3^- \rangle$														04Ca38
11864.5(5)	$\langle 0^+ \rangle$														04Ca38
11868.6(5)	$\langle 4^+ \rangle$														04Ca38
11869.8(5)	3^-														04Ca38
11872.0(5)	2^+														04Ca38
11877.8(5)	1^-														04Ca38
11884.3(5)	1^+														04Ca38
11888.1(5)	4^+														04Ca38
11890.7(5)	1^-														04Ca38
11893.8(5)	$\langle 2^- \rangle$														04Ca38

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	T	ℓ_p	$S_p'^+$ eval	ℓ_n	S_n^- eval	L (p,t)	σ (p,t) mb	σ (p,t) *rel.*	σ (τ,n) μb/sr	S_α *rel.*	S_α (^{6}Li,d)	$\Gamma_\circ$ [meV]	$B(E2)$	Ref.
11901.2(5)	1^+														04Ca38
11915.7(5)	3^-														04Ca38
11924.4(5)	2^+														04Ca38
11929.8(5)	$4^{\langle+\rangle}$														04Ca38
11933.1(5)	1^-														04Ca38
11934.8(5)	1^+														04Ca38
11937.1(5)	2^-														04Ca38
11940.2(5)	1^+														04Ca38
11942.6(5)	3^-														04Ca38
11944.8(5)	1^-														04Ca38
11948.2(5)	0^+														04Ca38
11958.5(5)	$\langle 2^+\rangle$														04Ca38
11962.7(5)	0^+														04Ca38
11969.6(5)	1^+														04Ca38
11970.8(5)	2^+														04Ca38
11974.9(5)	1^-														04Ca38
11983.1(5)	$\langle 2^-\rangle$														04Ca38
11988(2)	0^+	2								280					77Bo16
11993.8(5)	0^-														04Ca38
12000(5)	$\langle 3,5\rangle^-$	0													
12001.1(5)	$\langle 2^+\rangle$											0.15			94Ya04
12007.2(5)	1^+														04Ca38
12010.2(5)	2^-														04Ca38
12012.0(5)	4^+														04Ca38
12023.4(5)	1^+														04Ca38
12026.7(5)	4^+														04Ca38
12033.6(5)	3^-														04Ca38
12038(3)	$\langle 3,4,5\rangle^-$														04Ca38
12047.5(5)	2^+														04Ca38
12056.2(5)	2^+														04Ca38
12058.7(5)	1^-														04Ca38
12067.1(5)	2^+														04Ca38
12067.6(5)	4^+														04Ca38
12068(3)	$\langle 3,5\rangle^-$	0													04Ca38
12076.6(5)	2^-														04Ca38
12081.8(5)	$4^{\langle+\rangle}$														04Ca38
12085.9(5)	$4^{\langle+\rangle}$														04Ca38
12088.6(5)	2^-														04Ca38
12089.6(5)	2^+														04Ca38
12092.9(5)	$5^{\langle+\rangle}$														04Ca38
12094.9(5)	2^+											0.19			94Ya04
12105.8(5)	$4^{\langle+\rangle}$														04Ca38
12110.5(5)	2^+											incl			04Ca38
12114.9(5)	3^-														04Ca38
12125.7(5)	$\langle 3^+\rangle$														04Ca38

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	T	ℓ_p	$S_p'^+$ eval	ℓ_n	S_n^- eval	L (p,t)	σ (p,t) mb	σ (p,t) *rel.*	σ (τ,n) μb/sr	S_α *rel.*	S_α (^{6}Li,d)	$\Gamma_\circ$ [meV]	$B(E2)$	Ref.
12132.5(5)	$\langle 4^+ \rangle$														04Ca38
12134.7(5)	$\langle 4^+ \rangle$														04Ca38
12141.1(5)	2^+														04Ca38
12152.1(5)	4^+														04Ca38
12157.8(5)	$4^{\langle + \rangle}$														04Ca38
12159.3(5)	$4^{\langle + \rangle}$														04Ca38
12177.5(5)	$1^{\langle - \rangle}$														04Ca38
12180.0(5)	2^+											0.13			94Ya04
12184.3(5)	2^-														04Ca38
12192.6(5)	2^+														04Ca38
12196.1(5)	$1^{\langle - \rangle}$														04Ca38
12201.0(5)	3^-														04Ca38
12209.1(5)	0^-														04Ca38
12211.7(5)	4^+														04Ca38
12217.5(5)	1^+														04Ca38
12224.1(5)	1^-														04Ca38
12226.3(5)	2^+														04Ca38
12237.6(5)	1^+														04Ca38
12243.8(5)	4^+														04Ca38
12245.1(5)	1^-														04Ca38
12332	$\langle 2^- \rangle$														04Ca38
12334.9(10)	$\langle 10^+ \rangle$														04Ca38
12340	$\langle 5^- \rangle$											0.10			94Ya04
12423															04Ca38
12450	$\langle 4^+ \rangle$											0.061			94Ya04
12488	$\langle 1^+ \rangle$														04Ca38
12503	$\langle 2^- \rangle$														04Ca38
12591.9(10)	$\langle 10^+ \rangle$														04Ca38
12604															04Ca38
12622	$\langle 2 \rangle$														04Ca38
12650	$\langle 7^- \rangle$											0.11			94Ya04
12668															04Ca38
12688															04Ca38
12720	$\langle 3^- \rangle$											0.20			94Ya04
12749	$\langle 2^- \rangle$														04Ca38
12830	$\langle 1^+,2^- \rangle$														04Ca38
12900	$\langle 4^+ \rangle$											0.07			94Ya04
12923(2)	$\langle 11^- \rangle$														04Ca38
12980															04Ca38
12996															04Ca38
13049	$\langle 1^+ \rangle$														04Ca38
13050	$\langle 4^+ \rangle$											0.06			94Ya04
13086															04Ca38
13113															04Ca38
13115.1(10)	$\langle 12^+ \rangle$														04Ca38

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	T	ℓ_p	$S_p'^+$ eval	ℓ_n	S_n^- eval	L (p,t)	σ (p,t) mb	σ (p,t) *rel.*	σ (τ,n) μb/sr	S_α *rel.*	S_α (^{6}Li,d)	$\Gamma_\circ$ [meV]	$B(E2)$	Ref.
13147	$\langle 2^- \rangle$														04Ca38
13194															04Ca38
13195(2)	$\langle 10^- \rangle$														04Ca38
13200	$\langle 4^+ \rangle$											0.05			94Ya04
13203															04Ca38
13250															04Ca38
13289															04Ca38
13300	$\langle 4^+ \rangle$											0.045			94Ya04
13420	$[2^+]$														87Ya11
13445	$\langle 2^- \rangle$														04Ca38
13445	$\langle 2^- \rangle$														04Ca38
13450	$\langle 0^+ \rangle$														04Ca38
13470	$\langle 4^+ \rangle$											0.28			94Ya04
13480	$\langle 1^+ \rangle$														04Ca38
13535.5(13)	$\langle 11^+ \rangle$														04Ca38
13610	$[2^+]$														87Ya11
13620	$\langle 6^+ \rangle$											0.016			94Ya04
13666	$\langle 2^- \rangle$														04Ca38
13700	$[2^+]$														87Ya11
13720	$\langle 6^+ \rangle$											0.023			94Ya04
13830	$[2^+]$											0.18			94Ya04
13830	$\langle 7^- \rangle$														04Ca38
13890	$[0^+]$														87Ya11
13900	$\langle 2^+ \rangle$														04Ca38
13913	$\langle 4^- \rangle$	$\langle 0 \rangle$													04Ca38
13953	$\langle 4^+ \rangle$											0.06			94Ya04
13993	$[3^-]$														87Ya11
14097	$[2^+]$														87Ya11
14190	$\langle 4^+ \rangle$											0.07			94Ya04
14200	$\langle 0^+ \rangle$														04Ca38
14210	$[3^-]$														87Ya11
14232.4(10)	$\langle 12^+ \rangle$														04Ca38
14283(15)	$\langle 6^- \rangle$	1													89Sa23
14320	$[3^-]$														87Ya11
14370	$\langle 6^+ \rangle$											0.03			94Ya04
14410	$\langle 3^- \rangle$														87Ya11
14460	$\langle 2^+ \rangle$														04Ca38
14530	$\langle 6^+ \rangle$											0.03			94Ya04
14600	$\langle 1\text{–}4^+ \rangle$														04Ca38
14660	$\langle 2^+ \rangle$														87Ya11
14680															04Ca38
14750	$\langle 4^+ \rangle$											0.078			94Ya04
14780	$\langle 2^+ \rangle$														87Ya11
14870												0.33			94Ya04
15080															87Ya11

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	T	ℓ_p	$S_p'^+$ eval	ℓ_n	S_n^- eval	L (p,t)	σ (p,t) mb	σ (p,t) *rel.*	σ (τ,n) μb/sr	S_α *rel.*	S_α (^{6}Li,d)	$\Gamma_\circ$ [meV]	$B(E2)$	Ref.
15140															04Ca38
15152.4(12)	$\langle 13^+ \rangle$														04Ca38
15250															04Ca38
15267.1(14)	$\langle 12^+ \rangle$														04Ca38
15306(2)	$\langle 13^- \rangle$														04Ca38
15330															04Ca38
15600															04Ca38
15700															04Ca38
15748.1(14)	$\langle 12^+ \rangle$														04Ca38
15900	$\langle 3^- \rangle$														04Ca38
16529.4(12)	$\langle 14^+ \rangle$														04Ca38
16579.7(16)	$\langle 13^+ \rangle$														04Ca38
16700															04Ca38
17670															04Ca38
17698.6(14)	$\langle 14^+ \rangle$														04Ca38
17700	$\langle 2^+ \rangle$														04Ca38
17859															04Ca38
18054.6(14)	$\langle 14^+ \rangle$														04Ca38
18147															04Ca38
18260	$\langle 2^+ \rangle$														04Ca38
18327															04Ca38
18453															04Ca38
18497.2(17)	$\langle 14^+ \rangle$														04Ca38
18680															04Ca38
18719.2(17)	$\langle 14^+ \rangle$														04Ca38
18732															04Ca38
19038															04Ca38
19070															04Ca38
19195.6(16)	$\langle 15^+ \rangle$														04Ca38
19450	$\langle 0^+ \rangle$														04Ca38
19850															04Ca38
20130															04Ca38
20430															04Ca38
20578.6(15)	$\langle 16^+ \rangle$														01Id01
20850															04Ca38
20940															04Ca38
21490															04Ca38
21690															04Ca38
22060															04Ca38
22060.4(20)	$\langle 16^+ \rangle$														01Id01
23360	$\langle 1^- \rangle$														04Ca38

(continued) **$^{40}_{20}$Ca**

E^*	J^π	T	ℓ_p	S'^+_p	ℓ_n	S^-_n	L	σ (p,t)	σ (p,t)	σ (τ,n)	S_α	S_α	$\Gamma_\circ$	$B(E2)$	Ref.
[keV]				eval		eval	(p,t)	mb	*rel.*	μb/sr	*rel.*	(^{6}Li,d)	[meV]		
								02SeZQ	74Se05	77Bo16	79Fo04		82Mo05		Ref.
				77En02		77En02		04Ca38				94Ya04	02Ha13	02Ha13	Ref.

Additional data on this isotope can be found in [04To07, 02Ha13, 01Ba66, 01Id01, 00Po14, 00Br54, 00Ha34, 99St12, 95Di03, 94Sa47, 94Ya08, 93Ya07, 93Ud01, 92Va06, 90Ki07, 89Fu07, 89Sa23, 85Se14, 74De42, 72Lo10, 69Bl09, 67Se10, 66Er05].

Abundance: 96.94(16) %.

* $B(E1)$ in units $10^{-3}e^2fm^2$; in the case of E2 transition its strength is expressed in the same column in units e^2fm^4 [02Ha13].

** Value C^2S from measurements of the (τ,d) reaction in [94Ve04].

*** B(M1)=1.12(7) $\mu^2{}_N$ for the ground state transition [80St17].

Data from 10 experimental works were used in [77En02] for evaluation of given here spectroscopic factors S'^+_p, S^-_n.

Comparison of $S''=(2J_f+1)S/(2J_i+1)$ from ^{39}K(d,n)^{40}Ca and ^{39}K(d,p)^{40}K reactions leading to T=1 states can be found in [69Fu01].

Comparison of $\Gamma_\circ$ from different measurements can be found in [02Ha13].

Integrated cross sections σ (p,t) [02SeZQ] are from [04Ca38]; comparison of the theoretical expectations to the measured cross sections [74Se05] can be found in Supplement .

Cross section of the (τ,n) reaction (two-proton transfer) was measured at 0° and 25° by the time-of-flight method; the ratio $R=\sigma_{exp}/\sigma_{DWBA}$ given in Supplement is similar to the spectroscopic factor [77Bo16].

Relative values S_α from [79Fo04] for groups of positive- and negative-parity levels are normalized separately to 1.0 for states at E^*=0.0 and 3.74 MeV, respectively; other values S_α are from [94Ya04].

Data for this isotope are considered in vol. LB I/18A.

Energy levels and branching ratios [90En08, 98En04, 04Ca38, 77En02] Part 2 **$^{40}_{20}$Ca**

E^*	J^π	σ (p,t)	R	S_N	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
							E^*_f:	0	3353	3737	3904	4491
[keV]		theor		(τ,d)	Γ_{cm}		J^π_f:	0^+	0^+	3^-	2^+	5^-
0	0^+	100	2.90	5.83	Stable	77En02						
3352.62(9)	0^+	3.4	0.052		2.16(6) ns	77En02		x				
3736.69(5)	3^-			0.60	47(2) ps	77En02		100				
						77En02						
3904.38(3)	2^+		0.42		34(2) fs	77En02		100	0.08(1)			
4491.43(4)	5^-			0.73	290(10) ps	77En02		<0.5		100	<1	
5211.6(2)	0^+	2.5			1.1(2) ps	74Se05					100	
5248.79(5)	2^+				110(30) fs	02Ha13		80(1)	4.9(6)	<0.6	15(1)	
5278.80(6)	4^+				230(35) fs					<0.9	100	<1.1
5613.52(3)	4^-			0.76	0.67(10) ps	77En02				70(2)		30(2)
5629.41(6)	2^+				53(12) fs	02Ha13		88(1)	12(1)	<1.1	<0.8	
5902.63(7)	1^-				18(3) fs	77En02		100		<6	<0.8	

(continued) **$^{40}_{20}$Ca**

E^*	J^π	σ (p,t)	R	S_N	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
							E_f^*: 0	3353	3737	3904	4491
[keV]		theor		(τ,d)	Γ_{cm}		J_f^π: 0^+	0^+	3^-	2^+	5^-
						77En02					
6025.47(5)	2^-				0.15(3) ps	77En02	<2.0		83(1)	17(1)	
						77En02					
6029.71(6)	3^+				0.38(7) ps	77En02			<6.0	79(2)	
						77En02					
6160	$\langle 3^- \rangle$					04Ca38					
6285.15(4)	3^-			0.62	0.34(5) ps	02SeZQ	3.1(5)		3.5(4)	20(1)	72.6(11)
6422.4(10)	2^+				9.1(11) fs	02Ha13	100				
6507.9(1)	4^+				125(25) fs	02SeZQ			<3.0	84(3)	<2.0
6542.80(9)	4^+				125(25) fs				<3	59(2)	<2.0
6582.5(1)	3^-			0.21	175(30) fs	77En02	<2		66(1)	16(1)	<0.7
						77En02					
6750.41(7)	2^-			0.94	100(25) fs	77En02	<8		100	<10	
						77En02					
6908.70(8)	2^+				2.4(3) fs	02Ha13	100		<0.9	<0.7	
6930.2(3)	6^+				0.34(+9-17) ps	04Ca38			<6		
6931.29(6)	3^-				1.4(6) ps	04Ca38	<3.0		83(1)	2.0(5)	1.4(3)
6938.0(18)	1^-–5^-				0.42(17) ps				100		
6950.48(7)	1^-		0.48	0.4	0.95(4) fs	77En02	100		<5	<4	
						77En02					
7100	$\langle 2^+ \rangle$					04Ca38					
7113.1(10)	1^-			0.20	55(30) fs		65			18	
7113.73(5)	4^-			incl	75(30) fs	02SeZQ			65.1(7)		25.9(5)
7239.07(8)	3^-–5^-				95(50) fs				40		40
7277.82(8)	$\langle 2,3 \rangle^+$				50(35) fs		<3		100		
7300.67(11)	0^+	1.4			120(35) fs	74Se05			<2	<5	
7397(1)	$\langle 5^+ \rangle$				0.47(14) ps						
7421.9(15)	2^+–6^+				0.20(14) ps	02SeZQ			100		
7446.23(6)	$\langle 3,4 \rangle^+$				0.14(5) ps				<0.9	<2.0	<1.4
7466.35(7)	2^+				8(4) fs	02SeZQ	55(2)	11.6(10)	<1.7	20.0(14)	
7532.26(5)	2^-				165(30) fs		<2.0		42(2)	15(1)	
7561.17(7)	4^+				0.14(4) ps	04Ca38			9(2)	<4.0	
7623.11(8)	2^-–4^+				0.11(3) ps	02SeZQ	<0.5		20.6(7)	<1.0	<0.7
7658.23(5)	4^-				<10 fs	02SeZQ			26(3)		22(3)
7676.6(5)	$\langle 6^+ \rangle$				0.21(5) ps						
7694.08(4)	3^-				<10 fs		<3.0		90.8(12)	<2.0	<2.0
7701.8(4)	0^+	1.3	0.075			74Se05				100	
7769.4(10)	$\langle 3$–$5^- \rangle$				165(35) fs	02SeZQ			66(6)		
7814.7(6)	0^+					02SeZQ				70	
7870	$\langle 3^- \rangle$					04Ca38					
7872.18(9)	2^+				2.0(2) fs	02Ha13	100				
7928.42(10)	4^+				50(35) fs	02SeZQ			<7	<5	50(9)
7972.5	$\leq 3^-$					04Ca38					
7974.4(8)	$\langle 6^+ \rangle$										
7976.55(3)	2^+				<40 fs	02SeZQ	10	30		50	

(continued) **$^{40}_{20}$Ca**

E^*	J^π	σ (p,t)	R	S_N	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
							E_f^*:	0	3353	3737	3904	4491
[keV]		theor		(τ,d)	Γ_{cm}		J_f^π:	0^+	0^+	3^-	2^+	5^-
8018.8(10)	0^+					02SeZQ						
8051.8(6)												
8091.61(17)	2^+		0.42		3.1(2) fs	02Ha13		100				
8098.9(7)	8^+				12.5(17) ps							
8113.2(5)	$1^{\langle-\rangle}$				38(17) fs	02Ha13		100				
8134.77(10)	$\langle 2\text{–}4^+\rangle$				<30 fs						49(14)	<7
8187.5(8)	$\langle 3\text{–}5^-\rangle$				<17 fs					100		
8195.9(6)						02SeZQ						
8271(1)	$\langle 0\text{–}3\rangle^-$											
8276(1)	0^+	0.5	0.44			02SeZQ						
8323.16(8)	$\langle 1^-,2^+\rangle$				55(20) fs			2.3(8)		66(2)	<1.5	<0.5
8338.0(3)	$\langle 2^+\text{–}5^-\rangle$					02SeZQ						
8358.9(6)	$\langle 0\text{–}2\rangle^-$				100(25) fs							
8364(5)	$3^-\text{–}7^-$					04Ca38						
8373.94(15)	4^+					02SeZQ					100	
8424.81(11)	2^-				<17 fs			<1.5		70(4)	<4.0	
8439.0(5)	0^+	0.1				74Se05						
8484.02(13)	0^+		0.44		25(14) fs	02SeZQ				100		
8540(4)	$1,2^+$				<30 fs			60	40			
8551.1(7)	5^-				<17 fs	02SeZQ						100
8578.80(9)	2^+				4.9(6) fs	02SeZQ		100		<6	<4	
8587(2)	$2^+,3$									60	10	
8631(5)												
8665.3(8)	1^-							100				
8678.29(10)	4^+				40(35) fs	02SeZQ				83(19)		
8701(1)	6^-					04Ca38						
8717(8)						04Ca38						
8748.22(9)	2^+				7(2) fs	02Ha13		100				
8764.18(6)	3^-					02SeZQ					24(7)	
8810(7)	$\langle 2^+\rangle$					04Ca38						
8850.6(9)	$\langle 6\text{–}8\rangle^-$					02SeZQ						
8909.0(9)						02SeZQ						
8934.81(7)	2^+					94Ya04						
8935.8(9)	$\langle 7^+\rangle$											
8938.4(9)	0^+					02SeZQ						
8980(5)	$\langle 5\text{–}7\rangle^+$											
8982.5(5)	2^+				9(2) fs	04Ca38		100				
8994.50(11)	$\langle 1^-,2^+\rangle$							100				
9031.9(3)	4^-					02SeZQ						28(5)
9050.1(10)												
9080.3(11)												
9091.70(6)	3^-											
9135.66(5)	$\langle 3\rangle^-$					94Ya04						
9162.1(11)						02SeZQ						
9185.3(12)												

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	σ (p,t) theor	R	S_N (τ,d)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: J_f^π:	0 0^+	3353 0^+	3737 3^-	3904 2^+	4491 5^-
9209.77(5)	$\langle 2,3\rangle^-$											
9226.69(5)	$\langle 1^-$–$3^-\rangle$											
9227.43(7)	$\langle 1,2^+\rangle$											
9240	6^+					94Ya04						
9246.0(12)	$\langle 6$–$8\rangle^-$					02SeZQ						
9274.5(12)						02SeZQ						
9304(5)	0^+					02SeZQ						
9305.2(8)	$\langle 8^+\rangle$											
9362.54(6)	3^-		0.40			94Ya04						
9377.8(2)						02SeZQ						
9388.20(19)	2^+											
9395.7(3)	$\langle 3^-,4^+\rangle$											
9404.85(19)	2^-				0.14 keV							
9406.4(6)	0^+	29				74Se05						
9412.4(2)												
9418.8(2)	3^-											
9429.11(5)	$\langle 3,4\rangle^-$											
9432.46(18)	1^-				0.23 keV							
9453.95(5)	3^-				0.09 keV							
9500.0(15)	$\langle 2^+\rangle$					94Ya04						
9536.35(16)	$\langle 3,4\rangle^+$											
9537.9(5)	1^-				0.4 keV							
9564(5)	2^+		0.72			02SeZQ						
9603.0(4)	3^-											
9604.6(4)	1^-				0.19(5) keV							
9640.89(7)	2^-											
9655.6(9)	$\langle 1,2^+\rangle$											
9662.3(2)	$\langle 0$–$3\rangle^-$											
9668.71(8)	3^-					94Ya04						
9779.47(7)	3											
9785.3(2)	$\langle 1,2^+\rangle$											
9802.2(7)	$\langle 1$–$3\rangle^-$											
9811.1(2)	$\langle 3$–$5^-\rangle$											
9829.54(16)	$\langle 1^-$–$4^+\rangle$											
9835.08(19)	$\langle 2^+$–$5^-\rangle$											
9853.5(8)	$\langle 8^+\rangle$					04Ca38						
9854.54(17)	$\langle 1$–$3\rangle^-$											
9859.7(3)	$\langle 4$–$6\rangle^-$											
9865.15(11)	1				0.10(2) keV	82Mo05						
9869.3(4)	1^+				0.9(2) keV	04Ca38						
9870	$[2^+]$					94Ya04						
9898.6(3)												
9921.4(2)	$\langle 3$–$5^-\rangle$											
9939.8(2)												
9950	$[1^-,5^-]$					94Ya04						

(continued) **$^{40}_{20}$Ca**

E^*	J^π	σ (p,t)	R	S_N	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
							E_f^*: 0	3353	3737	3904	4491
[keV]		theor		(τ,d)	Γ_{cm}		J_f^π: 0^+	0^+	3^-	2^+	5^-
9954.00(9)	4^+										
9977.20(17)	$\langle 3–5\rangle$										
9993.71(5)											
10040.54(9)	$\langle 2^-,3^-\rangle$										
10045.7(5)	$\langle 3^–7^-\rangle$										
10049.38(7)	4^-										
10058.0(3)											
10065(2)	$\langle 1^-,2^+\rangle$					94Ya04					
10080.7(2)											
10130.70(19)	$\langle 3^-,4^+\rangle$										
10154(7)	$3^–5^-$					94Ya04					
10193(7)	$3^–5^-$										
10199.2(4)	$\langle 1^-\rangle$				0.27 keV						
10205.1(8)											
10210.6(2)	$\langle 3,4\rangle^-$										
10232.8(7)											
10262.53(10)	3^-				0.4 keV						
10267.7(5)	1^-					04Ca38					
10274.8(3)	$\langle 3–5\rangle^+$										
10277.9(2)	$\langle 1^-\rangle$				1.1 keV						
10285.0(3)	1^-					04Ca38					
10319(1)***	1^+				26(7) eV	82Mo05					
10333.7(5)	3^-					04Ca38					
10340	$[8^+]$					94Ya04					
10358.6(15)											
10361.5(15)	3^-				3.9 keV						
10362.6(5)	1^-					04Ca38					
10364.6(5)	1^-					04Ca38					
10376.6(5)	1^-					04Ca38					
10383.90(16)	$\langle 1^-,2^+\rangle$										
10415.06(6)	3										
10420.2(5)	1^-					04Ca38					
10430.58(19)	N										
10443.4(5)	2^-					04Ca38					
10443.9(2)	3^-				0.44 keV						
10446.8(5)	1^-					04Ca38					
10470.0(15)	$\langle 3,5\rangle^-$										
10474(2)											
10478.7(1)											
10503.1(15)	$\langle 3,4,5\rangle^-$										
10514.8(15)	$3^-,4^+,5^-$										
10516.3(5)						04Ca38					
10529.6(5)	$\langle 1^+\rangle$					04Ca38					
10541.5(5)	0^+					04Ca38					
10552.2(15)											

(continued) **$^{40}_{20}$Ca**

E^*	J^π	σ (p,t)	R	S_N	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
							E_f^*:	0	3353	3737	3904	4491
[keV]		theor		(τ,d)	Γ_{cm}		J_f^π:	0^+	0^+	3^-	2^+	5^-
10583(5)	$\langle 3,4,5\rangle$											
10596.2(5)	3^-					94Ya04						
10598.4(5)	$\langle 1^+\rangle$					04Ca38						
10607.4(5)	$0^{\langle +\rangle}$					04Ca38						
10618.6(5)	2^-					04Ca38						
10621.4(5)	0^+					04Ca38						
10633.6(5)	$\langle 1^-\rangle$					04Ca38						
10639.07(7)	$\langle 3^-$–$5^-\rangle$											
10646.4(4)	N											
10653.23(16)	$\langle 1^-$–$4^+\rangle$											
10657.4(5)	2^+				0.35 keV							
10666.4(5)	2^-					04Ca38						
10670.4(3)	1^-				5.7 keV							
10673.69(17)	$\langle 2^-\rangle$					04Ca38						
10676.4(5)	1^-				0.33 keV	94Ya04						
10691.0(3)	2^+				0.14 keV							
10699.50(10)	3											
10700.9(5)	0^+					04Ca38						
10720.8(3)	$\langle 3,5\rangle^-$											
10722.1(5)	1^+											
10737.7(3)	1^-				0.5 keV							
10740.1(5)	1^-					04Ca38						
10747.8(4)	4^+											
10748.8(5)	0^+					04Ca38						
10753.85(18)	$\langle 3,4,5\rangle$											
10770.2(3)	$\langle 1^+\rangle$					04Ca38						
10776.3(3)	3^-				12 keV							
10780.5(5)	$\langle 3^-\rangle$					04Ca38						
10780.9(3)	2^+				0.18 keV							
10783.1(5)	$\langle 0^-\rangle$											
10787.7(3)												
10800.0(10)	$\langle 1^-,2^+\rangle$											
10802.6(5)	$0^{\langle +\rangle}$					04Ca38						
10813.7(5)	$3^-,4^+,5^-$					94Ya04						
10816.2(5)	2^-					04Ca38						
10816.4(5)	3^+					04Ca38						
10830.6(6)	N											
10833.0(5)	$3^{\langle -\rangle}$					04Ca38						
10848.5(4)	$\langle 3,5\rangle^-$											
10849.2(5)	2^-					04Ca38						
10852.0(5)	$\langle 1^-,2^-\rangle$					04Ca38						
10861.3(5)	2^+				45 eV	04Ca38						
10868.9(5)	1^-					04Ca38						
10869.5(5)	0^+					04Ca38						
10873.7(5)	1^-					04Ca38						

(continued) **$^{40}_{20}$Ca**

E^*	J^π	σ (p,t)	R	S_N	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
							E_f^*: 0	3353	3737	3904	4491
[keV]		theor		(τ,d)	Γ_{cm}		J_f^π: 0^+	0^+	3^-	2^+	5^-
10895(1)	$\langle 9^- \rangle$					04Ca38					
10899.1(5)	1^+					04Ca38					
10910.0(4)	$\langle 3–5 \rangle$				2.3 keV	94Ya04					
10914.6(5)	1^-					04Ca38					
10915.6(5)	3^+					04Ca38					
10921.1(4)	$\langle 2^+–4^+ \rangle$										
10932.5(5)	1^-				2.0 keV	04Ca38					
10933.2(5)	2^-					04Ca38					
10946.8(5)	2^+				0.23 keV						
10950.7(5)	1^-				10 keV						
10953.4(5)	$0^{\langle + \rangle}$	58				74Se05					
10956.0(4)	$3^-,4^+,5^-$										
10976.3(15)	$\langle 3,4,5 \rangle$										
10988.0(4)	$3^-,4^+,5^-$										
10988.5(5)	2^-					04Ca38					
10989.2(5)	$\langle 1^+ \rangle$					04Ca38					
10994.7(4)	$\langle 1^- \rangle$				6.7 keV						
10998.7(5)	$1^-,3^-$				0.20 keV	04Ca38					
11002.4(5)	$\langle 1,3 \rangle^-$										
11003.0(9)	$\langle 10^+ \rangle$										
11007.0(5)	1^-				5.0 keV	04Ca38					
11011.0(4)	3^-				0.3 keV						
11024.0(5)	$\langle 1^-,3^- \rangle$				0.27 keV						
11036.1(5)	$\langle 1^+ \rangle$					04Ca38					
11038(7)	$\langle 3,4,5 \rangle$										
11044.3(5)	2^+				0.50 keV						
11070.6(4)	$\langle 1^–4^+ \rangle$										
11073.3(5)	2^+					04Ca38					
11078.2(5)	1^-										
11083.4(5)	$\langle 1^+ \rangle$					04Ca38					
11087(3)	$\langle 3^-,4^+ \rangle$										
11089.1(5)	$0^{\langle + \rangle}$					94Ya04					
11106.8(5)	1^-				5.2 keV	04Ca38					
11118.8(5)	2^+				46 eV	04Ca38					
11128.9(5)	4^+				110 eV	04Ca38					
11143(6)	$\langle 3,4,5 \rangle^-$										
11145.0(5)	$1^{\langle - \rangle}$					04Ca38					
11145.6(5)	1^+					04Ca38					
11157.0(5)	2^-										
11161.3(5)	4^+										
11162.7(5)	2^+					04Ca38					
11167.2(5)	4^+					04Ca38					
11187.4(5)	3^-				1.4 keV	04Ca38					
11202.7(5)	$\langle 3 \rangle^-$					04Ca38					
11210	$\langle 0^+ \rangle$					94Ya04					

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	σ (p,t) theor	R	S_N (τ,d)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: J_f^π:	0 0^+	3353 0^+	3737 3^-	3904 2^+	4491 5^-
11212.4(5)	3^-				2.8 keV	04Ca38						
11217(3)	3^-				25 keV							
11217.6(5)	4^+				1.4 keV	04Ca38						
11231.2(5)	2^-					04Ca38						
11236(3)	1^-				12 keV							
11246.6(5)	3^-				92 eV	04Ca38						
11255.7(5)	1^+					04Ca38						
11260.6(5)	$\langle 0^- \rangle$					04Ca38						
11264.2(5)	2^+				0.34 keV	04Ca38						
11284.1(5)	$\langle 2^- \rangle$					04Ca38						
11289.6(5)	1^+					04Ca38						
11300.1(5)	1^+					04Ca38						
11302.3(5)	$\langle 1^- \rangle$					04Ca38						
11311(4)	3^-,4^+,5^-					94Ya04						
11319.8(5)	$\langle 0^- \rangle$					04Ca38						
11321.8(5)	2^+				0.52 keV	04Ca38						
11329.1(5)	2^+					04Ca38						
11330.5(5)	1^-				4.0 keV	04Ca38						
11338.5(5)	$\langle 1^+ \rangle$					04Ca38						
11346.2(5)	$4^{\langle + \rangle}$					04Ca38						
11351.3(5)	1^+					04Ca38						
11362.2(5)	1^+					04Ca38						
11365.8(5)	2^+				0.19 keV	04Ca38						
11366.8(5)	2^-					04Ca38						
11368.1(5)	$4^{\langle + \rangle}$				20 eV	04Ca38						
11370	$\langle 5^- \rangle$					94Ya04						
11371.2(5)	2^+				1.4 keV	04Ca38						
11381.9(5)	2^+				2.6 keV	04Ca38						
11392.8(5)	$1^{\langle - \rangle}$				0.10 keV	04Ca38						
11404.0(5)	1^-				3.5 keV	04Ca38						
11406.8(5)	1^+					04Ca38						
11414.6(5)	4^+				0.10 keV	04Ca38						
11420.1(5)	3^-				0.30 keV	04Ca38						
11432.5(5)	1^-				0.30 keV	04Ca38						
11436.6(5)	2^+				0.22 keV	04Ca38						
11447.0(5)	1^-				5.3 keV	04Ca38						
11451.2(5)	1^+					04Ca38						
11455.2(5)	3^-				60 eV	04Ca38						
11460.2(5)	2^+				1.17 keV	04Ca38						
11464.9(5)	$2^{\langle + \rangle}$				0.13 keV	04Ca38						
11468(3)	3^-,4^+,5^-					94Ya04						
11468.5(5)	2^-					04Ca38						
11479.6(5)	1^+					04Ca38						
11486.5(5)	0^+				0.11 keV	04Ca38						
11489.4(5)	1^+					04Ca38						

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	σ (p,t) theor	R	S_N (τ,d)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: / J_f^π: 0 / 0^+	3353 / 0^+	3737 / 3^-	3904 / 2^+	4491 / 5^-
11513.4(5)	2^+				0.62 keV	04Ca38					
11515.0(5)	$1^{\langle-\rangle}$				4.23 keV	04Ca38					
11518.8(5)	2^+					04Ca38					
11537.7(5)	2^-					04Ca38					
11542.0(5)	2^+				0.62 keV	04Ca38					
11543.5(5)	$\langle1^+\rangle$					04Ca38					
11546.5(5)	2^-					04Ca38					
11549(5)	$\langle3,5\rangle^-$										
11554.3(5)	1^-				0.95 keV	04Ca38					
11558.9(5)	$\langle2^+\rangle$					04Ca38					
11563.3(5)	$\langle2^-\rangle$					04Ca38					
11577.7(5)	2^-					04Ca38					
11577.8(5)	2^+				0.23 keV	04Ca38					
11585.4(5)	2^-					04Ca38					
11597.0(5)	$\langle2^+\rangle$					04Ca38					
11602.1(5)	2^+					04Ca38					
11603.2(5)	2^+				0.28 keV	04Ca38					
11605.1(5)	1^-				13 keV	04Ca38					
11610.9(5)	1^-				0.86 keV	04Ca38					
11613.8(5)	$\langle2^-\rangle$					04Ca38					
11617(10)	$\langle3,4,5\rangle$										
11628.3(5)	$\langle3^+\rangle$					04Ca38					
11628.9(5)	2^+				85 eV	04Ca38					
11637.9(5)	1^-				90 eV	04Ca38					
11644.8(5)	$\langle2^-\rangle$					04Ca38					
11646.7(5)	2^+				0.60 keV	04Ca38					
11650.6(5)	$2^{\langle+\rangle}$				0.18 keV	04Ca38					
11652.0(5)	3^-					04Ca38					
11653.3(5)	2^+				1.6 keV	04Ca38					
11661.5(5)	1^-				1.6 keV	04Ca38					
11663(6)	$3^-,4^+,5^-$					04Ca38					
11672.6(5)	$\langle2^-\rangle$					04Ca38					
11676.9(5)	2^+				0.96 keV	04Ca38					
11685.8(9)	$\langle10^+\rangle$										
11687.9(5)	$\langle1^+\rangle$					04Ca38					
11689.0(5)	$\langle2^-\rangle$					04Ca38					
11690	$\langle7^-\rangle$					94Ya04					
11692.6(5)	$4^{\langle+\rangle}$				21 eV	04Ca38					
11696.1(5)	$0^{\langle-\rangle}$					04Ca38					
11703.4(5)	0^+				4.65 keV	04Ca38					
11704.4(5)	2^-					04Ca38					
11707.6(5)	1^-				0.30 keV	04Ca38					
11708.7(12)	$\langle9^+\rangle$					04Ca38					
11713.4(5)	1^+					04Ca38					
11715.5(5)	2^-					04Ca38					

(continued) **$^{40}_{20}$Ca**

E^*	J^π	σ (p,t)	R	S_N	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
							E_f^*:	0	3353	3737	3904	4491
[keV]		theor		(τ,d)	Γ_{cm}		J_f^π:	0^+	0^+	3^-	2^+	5^-
11721.0(5)	1^+					04Ca38						
11723.9(5)	$3^{\langle-\rangle}$				60 eV	04Ca38						
11726(5)	$\langle 3,5\rangle^-$											
11730.8(5)	$1^{\langle-\rangle}$				3.6 keV	04Ca38						
11730.9(5)	1^+					04Ca38						
11738.6(5)	2^+					04Ca38						
11742.6(5)	4^+				1.07 keV	04Ca38						
11744.4(5)	$1^{\langle-\rangle}$				0.55 keV	04Ca38						
11749.3(5)	2^-				2.57 keV	04Ca38						
11753.2(5)	3^-					04Ca38						
11753.8(5)	1^+				0.35 keV	04Ca38						
11757.1(5)	2^-					04Ca38						
11767.8(5)	$3^{\langle-\rangle}$				41 eV	04Ca38						
11775	$\langle 1^+\rangle$					04Ca38						
11782.4(5)	$3^{\langle-\rangle}$				41 eV	04Ca38						
11788.3(5)	2^+				2.5 keV	04Ca38						
11792.2(5)	1^+					04Ca38						
11799.0(5)	$4^{\langle+\rangle}$				0.18 keV	04Ca38						
11800	$[5^-]$					94Ya04						
11803.9(5)	0^+				0.26 keV	04Ca38						
11808.9(5)	$\langle 1^+\rangle$					04Ca38						
11810.7(5)	2^+				1.8 keV	04Ca38						
11811.4(5)	3^-				0.26 keV	04Ca38						
11820.4(5)	3^-				3.5 keV	04Ca38						
11830.6(5)	2^+				0.30 keV	04Ca38						
11839.0(5)	0^+				1.05 keV	04Ca38						
11841(6)	$3^-,4^+,5^-$											
11843.9(5)	1^+					04Ca38						
11855.6(5)	2^+				0.39 keV	04Ca38						
11857.1(5)	$\langle 1^+\rangle$					04Ca38						
11863.1(5)	$\langle 3^-\rangle$				0,41 keV	04Ca38						
11864.5(5)	$\langle 0^+\rangle$					04Ca38						
11868.6(5)	$\langle 4^+\rangle$				32 eV	04Ca38						
11869.8(5)	3^-				40 eV	04Ca38						
11872.0(5)	2^+				0.87 keV	04Ca38						
11877.8(5)	1^-				0.32 keV	04Ca38						
11884.3(5)	1^+					04Ca38						
11888.1(5)	4^+				0.13 keV	04Ca38						
11890.7(5)	1^-					04Ca38						
11893.8(5)	$\langle 2^-\rangle$					04Ca38						
11901.2(5)	1^+					04Ca38						
11915.7(5)	3^-				1.0 keV	04Ca38						
11924.4(5)	2^+				2.2 keV	04Ca38						
11929.8(5)	$4^{\langle+\rangle}$				30 eV	04Ca38						
11933.1(5)	1^-				16.1 keV	04Ca38						

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	σ (p,t) theor	R	S_N (τ,d)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: / J_f^π: 0 0^+	3353 0^+	3737 3^-	3904 2^+	4491 5^-
11934.8(5)	1^+					04Ca38					
11937.1(5)	2^-					04Ca38					
11940.2(5)	1^+					04Ca38					
11942.6(5)	3^-				0.48 keV	04Ca38					
11944.8(5)	1^-				0.40 keV	04Ca38					
11948.2(5)	0^+				0.31 keV	04Ca38					
11958.5(5)	$\langle 2^+ \rangle$				1.0 keV	04Ca38					
11962.7(5)	0^+				0.30 keV	04Ca38					
11969.6(5)	1^+					04Ca38					
11970.8(5)	2^+				0.26 keV	04Ca38					
11974.9(5)	1^-				55 eV	04Ca38					
11983.1(5)	$\langle 2^- \rangle$				1.0 keV	04Ca38					
11988(2)	0^+		0.48		81(10) eV	77Bo16					
11993.8(5)	0^-					04Ca38					
12000(5)	$\langle 3,5 \rangle^-$										
12001.1(5)	$\langle 2^+ \rangle$				1.02 keV	94Ya04					
12007.2(5)	1^+					04Ca38					
12010.2(5)	2^-					04Ca38					
12012.0(5)	4^+				10 eV	04Ca38					
12023.4(5)	1^+					04Ca38					
12026.7(5)	4^+				0.22 keV	04Ca38					
12033.6(5)	3^-				0.31 keV	04Ca38					
12038(3)	$\langle 3,4,5 \rangle^-$					04Ca38					
12047.5(5)	2^+				2.65 keV	04Ca38					
12056.2(5)	2^+					04Ca38					
12058.7(5)	1^-				1.11 keV	04Ca38					
12067.1(5)	2^+				1.15 keV	04Ca38					
12067.6(5)	4^+				1.11 keV	04Ca38					
12068(3)	$\langle 3,5 \rangle^-$					04Ca38					
12076.6(5)	2^-				3.07 keV	04Ca38					
12081.8(5)	$4^{\langle + \rangle}$				21 eV	04Ca38					
12085.9(5)	$4^{\langle + \rangle}$				11 eV	04Ca38					
12088.6(5)	2^-					04Ca38					
12089.6(5)	2^+				24 keV	04Ca38					
12092.9(5)	$5^{\langle + \rangle}$				60 eV	04Ca38					
12094.9(5)	2^+				9.4 keV	94Ya04					
12105.8(5)	$4^{\langle + \rangle}$				90 eV	04Ca38					
12110.5(5)	2^+					04Ca38					
12114.9(5)	3^-				0.78 keV	04Ca38					
12125.7(5)	$\langle 3^+ \rangle$					04Ca38					
12132.5(5)	$\langle 4^+ \rangle$				0.13 keV	04Ca38					
12134.7(5)	$\langle 4^+ \rangle$				0.10 keV	04Ca38					
12141.1(5)	2^+				1.24 keV	04Ca38					
12152.1(5)	4^+				0.36 keV	04Ca38					
12157.8(5)	$4^{\langle + \rangle}$				0.12 keV	04Ca38					

(continued) **$^{40}_{20}$Ca**

E^* [keV]	J^π	σ (p,t) theor	R	S_N (τ,d)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage				
							E_f^*:	0	3353	3737	3904	4491
							J_f^π:	0^+	0^+	3^-	2^+	5^-
12159.3(5)	$4^{\langle+\rangle}$				83 eV	04Ca38						
12177.5(5)	$1^{\langle-\rangle}$				0.22 keV	04Ca38						
12180.0(5)	2^+				1.50 keV	94Ya04						
12184.3(5)	2^-					04Ca38						
12192.6(5)	2^+				1.24 keV	04Ca38						
12196.1(5)	$1^{\langle-\rangle}$				0.95 keV	04Ca38						
12201.0(5)	3^-				2.1 keV	04Ca38						
12209.1(5)	0^-					04Ca38						
12211.7(5)	4^+				21 eV	04Ca38						
12217.5(5)	1^+					04Ca38						
12224.1(5)	1^-				1.46 keV	04Ca38						
12226.3(5)	2^+				0.43 keV	04Ca38						
12237.6(5)	1^+					04Ca38						
12243.8(5)	4^+				30 eV	04Ca38						
12245.1(5)	1^-				2.0 keV	04Ca38						
12332	$\langle 2^-\rangle$					04Ca38						
12334.9(10)	$\langle 10^+\rangle$					04Ca38						
12340	$\langle 5^-\rangle$					94Ya04						
12423						04Ca38						
12450	$\langle 4^+\rangle$					94Ya04						
12488	$\langle 1^+\rangle$					04Ca38						
12503	$\langle 2^-\rangle$					04Ca38						
12591.9(10)	$\langle 10^+\rangle$					04Ca38						
12604						04Ca38						
12622	$\langle 2\rangle$					04Ca38						
12650	$\langle 7^-\rangle$					94Ya04						
12668						04Ca38						
12688						04Ca38						
12720	$\langle 3^-\rangle$					94Ya04						
12749	$\langle 2^-\rangle$					04Ca38						
12830	$\langle 1^+,2^-\rangle$					04Ca38						
12900	$\langle 4^+\rangle$					94Ya04						
12923(2)	$\langle 11^-\rangle$					04Ca38						
12980						04Ca38						
12996						04Ca38						
13049	$\langle 1^+\rangle$					04Ca38						
13050	$\langle 4^+\rangle$					94Ya04						
13086						04Ca38						
13113						04Ca38						
13115.1(10)	$\langle 12^+\rangle$					04Ca38						
13147	$\langle 2^-\rangle$					04Ca38						
13194						04Ca38						
13195(2)	$\langle 10^-\rangle$					04Ca38						
13200	$\langle 4^+\rangle$					94Ya04						
13203						04Ca38						

(continued) **$^{40}_{20}$Ca**

E^*	J^π	σ (p,t)	R	S_N	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
							E_f^*:	0	3353	3737	3904	4491
[keV]		theor		(τ,d)	Γ_{cm}		J_f^π:	0^+	0^+	3^-	2^+	5^-
13250						04Ca38						
13289						04Ca38						
13300	$\langle 4^+ \rangle$					94Ya04						
13420	$[2^+]$					87Ya11						
13445	$\langle 2^- \rangle$					04Ca38						
13445	$\langle 2^- \rangle$					04Ca38						
13450	$\langle 0^+ \rangle$					04Ca38						
13470	$\langle 4^+ \rangle$					94Ya04						
13480	$\langle 1^+ \rangle$					04Ca38						
13535.5(13)	$\langle 11^+ \rangle$					04Ca38						
13610	$[2^+]$					87Ya11						
13620	$\langle 6^+ \rangle$					94Ya04						
13666	$\langle 2^- \rangle$					04Ca38						
13700	$[2^+]$					87Ya11						
13720	$\langle 6^+ \rangle$					94Ya04						
13830	$[2^+]$					94Ya04						
13830	$\langle 7^- \rangle$					04Ca38						
13890	$[0^+]$					87Ya11						
13900	$\langle 2^+ \rangle$					04Ca38						
13913	$\langle 4^- \rangle$					04Ca38						
13953	$\langle 4^+ \rangle$					94Ya04						
13993	$[3^-]$					87Ya11						
14097	$[2^+]$					87Ya11						
14190	$\langle 4^+ \rangle$					94Ya04						
14200	$\langle 0^+ \rangle$					04Ca38						
14210	$[3^-]$					87Ya11						
14232.4(10)	$\langle 12^+ \rangle$					04Ca38						
14283(15)	$\langle 6^- \rangle$					89Sa23						
14320	$[3^-]$					87Ya11						
14370	$\langle 6^+ \rangle$					94Ya04						
14410	$\langle 3^- \rangle$					87Ya11						
14460	$\langle 2^+ \rangle$					04Ca38						
14530	$\langle 6^+ \rangle$					94Ya04						
14600	$\langle 1\text{–}4^+ \rangle$					04Ca38						
14660	$\langle 2^+ \rangle$					87Ya11						
14680						04Ca38						
14750	$\langle 4^+ \rangle$					94Ya04						
14780	$\langle 2^+ \rangle$					87Ya11						
14870						94Ya04						
15080						87Ya11						
15140						04Ca38						
15152.4(12)	$\langle 13^+ \rangle$					04Ca38						
15250						04Ca38						
15267.1(14)	$\langle 12^+ \rangle$					04Ca38						
15306(2)	$\langle 13^- \rangle$					04Ca38						

(continued) **$^{40}_{20}$Ca**

E^*	J^π	σ (p,t)	R	S_N	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
							E_f^*: 0	3353	3737	3904	4491
[keV]		theor		(τ,d)	Γ_{cm}		J_f^π: 0^+	0^+	3^-	2^+	5^-
15330						04Ca38					
15600						04Ca38					
15700						04Ca38					
15748.1(14)	$\langle 12^+ \rangle$					04Ca38					
15900	$\langle 3^- \rangle$					04Ca38					
16529.4(12)	$\langle 14^+ \rangle$					04Ca38					
16579.7(16)	$\langle 13^+ \rangle$					04Ca38					
16700						04Ca38					
17670						04Ca38					
17698.6(14)	$\langle 14^+ \rangle$					04Ca38					
17700	$\langle 2^+ \rangle$					04Ca38					
17859						04Ca38					
18054.6(14)	$\langle 14^+ \rangle$					04Ca38					
18147						04Ca38					
18260	$\langle 2^+ \rangle$					04Ca38					
18327						04Ca38					
18453						04Ca38					
18497.2(17)	$\langle 14^+ \rangle$					04Ca38					
18680						04Ca38					
18719.2(17)	$\langle 14^+ \rangle$					04Ca38					
18732						04Ca38					
19038						04Ca38					
19070						04Ca38					
19195.6(16)	$\langle 15^+ \rangle$					04Ca38					
19450	$\langle 0^+ \rangle$					04Ca38					
19850						04Ca38					
20130						04Ca38					
20430						04Ca38					
20578.6(15)	$\langle 16^+ \rangle$					01Id01					
20850						04Ca38					
20940						04Ca38					
21490						04Ca38					
21690						04Ca38					
22060						04Ca38					
22060.4(20)	$\langle 16^+ \rangle$					01Id01					
23360	$\langle 1^- \rangle$					04Ca38					
		74Se05				Ref.					
			77Bo16	70Fo04		Ref.					

Energy levels and branching ratios [90En08, 98En04, 04Ca38, 77En02] Part 3 **$^{40}_{20}$Ca**

E^*	J^π		Branching ratios in percentage									
		E_f^*:	5249	5279	5613	5629	5903	6025	6030	6285	6508	6543
[keV]		J_f^π:	2^+	4^+	4^-	2^+	1^-	2^-	3^+	3^-	4^+	4^+
5629.41(6)	2^+		<1.0	<1.1								
5902.63(7)	1^-		<0.5									
6025.47(5)	2^-		<0.4		<0.4	<0.4						
6029.71(6)	3^+		21(2)	<1.0	<2.0	<2.0						
6285.15(4)	3^-		<0.3	<0.4	1.0(2)	<0.6						
6507.9(1)	4^+		13(3)	3.0(20)	<2.0	<2.0						
6542.80(9)	4^+		14(2)	8(2)	<2.0	19(2)						
6582.5(1)	3^-		<0.8	<0.9	17.8(15)	<0.5						
6750.41(7)	2^-		<8		<2	<7						
6908.70(8)	2^+		<0.4	<0.9		<0.6						
6930.2(3)	6^+			100								
6931.29(6)	3^-		6.1(3)	<0.30	2.0(3)	5.8(3)						
6950.48(7)	1^-		<2			<2						
7113.1(10)	1^-		14			3.0						
7113.73(5)	4^-			1.7(3)	6.2(4)			1.1(3)				
7239.07(8)	3^-–5^-				20							
7277.82(8)	$\langle 2,3\rangle^+$		<6	<10	<4	<5						
7300.67(11)	0^+		95.0(15)			5.0(15)						
7397(1)	$\langle 5^+\rangle$			100					x			
7446.23(6)	$\langle 3,4\rangle^+$		43(1)	24(1)	20.7(8)	12.8(7)						
7466.35(7)	2^+		13(2)	<0.6		<0.6						
7532.26(5)	2^-		<3.0		24(1)	<0.6	3.4(10)	4.8(4)		9.8(9)		
7561.17(7)	4^+		61(4)	<0.9	<0.9	<0.8			30(3)			
7623.11(8)	2^-–4^+		11.3(7)	<0.9	32(1)	36(1)						
7658.23(5)	4^-			<2	39(3)					13(2)		
7676.6(5)	$\langle 6^+\rangle$			100								
7694.08(4)	3^-		<1.5	<1.5	9.2(12)	<1.2						
7769.4(10)	$\langle 3$–$5^-\rangle$				34(6)							
7814.7(6)	0^+		30									
7928.42(10)	4^+		<6	<3	50(9)	<4						
7974.4(8)	$\langle 6^+\rangle$			x								x
7976.55(3)	2^+			10								
8018.8(10)	0^+		100									
8134.77(10)	$\langle 2$–$4^+\rangle$				12(4)	40(4)						
8271(1)	$\langle 0$–$3\rangle^-$							40				
8276(1)	0^+					100						
8323.16(8)	$\langle 1^-,2^+\rangle$		3.0(6)	<0.3	<0.3	<0.5	1.3(8)	17.5(11)		1.5(3)		
8338.0(3)	$\langle 2^+$–$5^-\rangle$										30(7)	70(7)
8424.81(11)	2^-		<4.0		<3.0		17(3)	13(3)				
8439.0(5)	0^+					100						
8578.80(9)	2^+		<5	<5		<4						
8587(2)	2^+,3			15				15				
8678.29(10)	4^+									17(7)		
8764.18(6)	3^-			37(11)		21(8)			18(7)			
9031.9(3)	4^-			12(5)	40(5)					10(3)		

Energy levels and branching ratios [90En08, 98En04, 04Ca38, 77En02] Part 4 **$^{40}_{20}$Ca**

E^*	J^π		Branching ratios in percentage									
		E_f^*:	6750	6932	6950	7399	7677	7694	7975	8102	8937	9306
[keV]		J_f^π:	2^-	$\langle 6^+\rangle$	1^-	$\langle 5^+\rangle$	$\langle 6^+\rangle$	3^-	$\langle 6^+\rangle$	$\langle 8^+\rangle$	$\langle 7^+\rangle$	$\langle 8^+\rangle$
8098.9(7)	8^+			100								
8271(1)	$\langle 0\text{–}3\rangle^-$				60							
8323.16(8)	$\langle 1^-,2^+\rangle$		8.3(7)									
8358.9(6)	$\langle 0\text{–}2\rangle^-$				100							
8935.8(9)	$\langle 7^+\rangle$			x		x						
9031.9(3)	4^-							10(3)				
9305.2(8)	$\langle 8^+\rangle$			x			x					
11003.0(9)	$\langle 10^+\rangle$									x		x
11708.7(12)	$\langle 9^+\rangle$										x	
12334.9(10)	$\langle 10^+\rangle$											x
12591.9(10)	$\langle 10^+\rangle$									x		x

Energy levels and branching ratios [90En08, 98En04, 04Ca38, 77En02] Part 5 **$^{40}_{20}$Ca**

E^*	J^π		Branching ratios in percentage									
		E_f^*:	9855	9865	10319	11004	11687	11710	12337	12593	13116	13537
[keV]		J_f^π:	$\langle 8^+\rangle$	1	1^+	$\langle 10^+\rangle$	$\langle 10^+\rangle$	$\langle 9^+\rangle$	$\langle 10^+\rangle$	$\langle 10^+\rangle$	$\langle 12^+\rangle$	$\langle 11^+\rangle$
11988(2)	0^+			57(5)	43(5)							
12334.9(10)	$\langle 10^+\rangle$		x									
13115.1(10)	$\langle 12^+\rangle$					x	x					
13535.5(13)	$\langle 11^+\rangle$							x				
14232.4(10)	$\langle 12^+\rangle$					x	x					
15152.4(12)	$\langle 13^+\rangle$										x	x
15267.1(14)	$\langle 12^+\rangle$								x			
15748.1(14)	$\langle 12^+\rangle$									x		
16529.4(12)	$\langle 14^+\rangle$										x	
16579.7(16)	$\langle 13^+\rangle$											x

Energy levels and branching ratios [90En08, 98En04, 04Ca38, 77En02] Part 6 **$^{40}_{20}$Ca**

E^*	J^π		Branching ratios in percentage				
		E_f^*:	14233	15154	15270	16530	18500
[keV]		J_f^π:	$\langle 12^+\rangle$	$\langle 13^+\rangle$	$\langle 12^+\rangle$	$\langle 14^+\rangle$	$\langle 14^+\rangle$
16529.4(12)	$\langle 14^+\rangle$		x				
17698.6(14)	$\langle 14^+\rangle$		x				
18054.6(14)	$\langle 14^+\rangle$		x				
18497.2(17)	$\langle 14^+\rangle$				x		
18719.2(17)	$\langle 14^+\rangle$				x		
19195.6(16)	$\langle 15^+\rangle$			x			

(continued) **$^{40}_{20}$Ca**

E^*	J^π	Branching ratios in percentage					
		E_f^*:	14233	15154	15270	16530	18500
[keV]		J_f^π:	$\langle 12^+ \rangle$	$\langle 13^+ \rangle$	$\langle 12^+ \rangle$	$\langle 14^+ \rangle$	$\langle 14^+ \rangle$
20578.6(15)	$\langle 16^+ \rangle$					x	
22060.4(20)	$\langle 16^+ \rangle$						x

Energy levels and branching ratios [90Ec01, 90En08, 98En04, 01Ca59]. **$^{41}_{20}$Ca**

E^*	$2J^\pi$	$2T$	S_n^+	$S_n'^+$	σ (d,p)	S'	C^2S	S'	ℓ_p	S'	σ (α,τ)	S_N	S_n^-	C^2S	Γ	Ref.
[keV]			eval	(d,p)	μb/sr	(d,p)	(d,p)	(d,p)		(τ,d)	(α,τ)	(α,τ)	eval	(p,d)		
0.0	7^-		0.85(9)	6.82	4800	8.0	0.77		2	≈10	15800	1.00	1.6(2)	1.47		77En02
1942.8(2)	3^-		0.67(7)	2.14	25000	3.76	0.54	2.5*			101	0.66	0.22(7)	0.04		77En02
2009.9(2)	3^+		0.11(3)	0.26	820	0.78	0.14				158	0.21	2.8(3)	3.0		77En02
2462.3(2)	3^-			0.67	8330		0.20	0.9*			29	0.26		0.004		90Ec01
2576.5(6)	5^-			0.03	140				1+3	0.7	14	0.005				90Ec01
2605.6(3)	5^+		0.22(2)		260						23		0.01(1)			77En02
2670.5(12)	1^+		0.01(1)	0.03	820	0.035	0.084				14		0.6(1)	0.70		77En02
2883.9(7)	7^+			0.12	190				3	1.5	141	0.03				90Ec01
2959.3(6)	7^-		0.01(1)		160						34	0.008	0.15(2)	0.10		77En02
3049.9(2)	3^+				130		0.092				9					90Ec01
3131(5)					30											
3201.3(7)	9^+			0.21	320		0.0083				487	0.02				90Ec01
3369.6(1)	11^+				70				3	2.1	86					90Ec01
3400.0(3)	1^+			0.03	840	0.03	0.12				29			0.10		90Ec01
3494.9(4)	5^+			0.01	160				1+3	0.9				0.34		90Ec01
3527.3(9)	3^+				200		0.038				65					90Ec01
3613.5(2)	1^-			0.13	2030	0.22	0.092	0.2*			35					90Ec01
3614.4(8)	7^+															
3677.0(6)	9^-				100						9					
3730.6(3)	3^-				1100	0.28	0.027	0.2								90Ec01
3740.4(5)	$\langle 3,5 \rangle^+$								1	0.21	58	0.07		0.31		
3829.8(2)	15^+				30				3	12.5	18					90Ec01
3845.9(6)	1^+			0.01	280	0.009	0.076							0.19		90Ec01
3914.8(2)	13^+								3	8.6	62					90Ec01
3920	1^+				60											
3944.4(3)	1^-			0.87	14400	1.45	0.57	1.1*			8	0.82				90Ec01
3974.4(5)	7^+				370				1+3	4.8	20					90Ec01
3976.0(2)	11^+															
4015.1(8)	11^-				120						16					90Ec01
4096.9(7)	5^+			0.03	150		0.035		3	3.9	25			0.48		90Ec01
4184.2(5)	$\langle 3,5 \rangle$				180	0.018										
4277.3(10)	$\langle 5–9 \rangle^-$			0.04	160						21					90Ec01
4328.0(10)	X^+				200						9					90Ec01
4343.1(10)	9^-				incl						incl					

(continued) **$^{41}_{20}$Ca**

E^* [keV]	$2J^\pi$	$2T$	S_n^+ eval	$S_n'^+$ (d,p)	σ (d,p) μb/sr	S' (d,p)	C^2S (d,p)	S' (d,p)	ℓ_p	S' (τ,d)	σ (α,τ) (α,τ)	S_N (α,τ)	S_n^- eval	C^2S (p,d)	Γ	Ref.
4415.0(7)	3^+			0.03	120											90Ec01
4451.0(10)	9^+			0.12	120		0.0074		1	0.26	101	0.02				90Ec01
4519.6(12)	13^+				50						18					90Ec01
4550.1(10)					80											
4569(5)																
4603.1(20)	3^-			0.12	2400	0.22	0.14	0.15*								90Ec01
4648(15)																
4728.1(6)	$\langle 3\rangle^+$										29					
4733.0(11)	$\langle 5\rangle^+$			0.07	270				1+3	1.4						90Ec01
4752.7(3)	1^-			0.27	4720	0.41	0.29	0.35*								90Ec01
4778.8(20)	$\langle 3\rangle^+$			0.11	220											90Ec01
4797(5)	1^+–13^+															
4815.7(16)	5^+			0.06	490	0.10	0.035				16			0.16		90Ec01
4830.7(9)	$\langle 3\rangle^+$			0.03	180									incl		90Ec01
4882.6(11)	5^-			0.38	530	0.69	0.091					0.13				90Ec01
4928(5)					70											
4974.9(11)	9^+			0.51	650	0.73	0.029		1+3	4.3	308	0.06				90Ec01
4995.1(18)					70											90Ec01
5010(2)**	1^+			0.01	180	0.005	0.17									90Ec01
5046.9(10)	$\langle 9\rangle^+$			0.04			0.11									90Ec01
5057.1(14)	$\langle 5$–$9\rangle^+$								1+3	3.2						
5072.3(9)	1^-			0.02												90Ec01
5078.4(25)	1^-			0.02												90Ec01
5095.3(10)	3^+			0.04	410											90Ec01
5120.7(12)	3^-			0.02	300											90Ec01
5148.1(16)	7^-			0.02	280											90Ec01
5154.4(16)					incl											90Ec01
5194.9(8)	9^+			0.24	330		0.029		1+3	2.3	153	0.04				90Ec01
5219.1(3)	$\langle 13,17\rangle^+$										42					90Ec01
5283.3(5)	5^+			0.11	625	0.12					11					90Ec01
5290.3(13)																
5305(4)					130											90Ec01
5340(2)	$\langle 7$–$11\rangle^+$								3	6.9						90Ec01
5350(1)	7^-															90Ec01
5370.3(8)	3^-			0.02	675	0.05										90Ec01
5411.4(7)	5^+			0.09	480				1	1.5	18					90Ec01
5451.7(11)	1^-			0.04	780	0.06	0.028									90Ec01
5468.8(9)	3^-			0.09	1800	0.14										90Ec01
5482.2(13)	$\langle 3\rangle^+$			0.06	530	0.04								0.16		90Ec01
5504.2(9)	5				40									incl		
5519.9(13)	$\langle 5\rangle^-$			0.06	180		0.0027									90Ec01
5539.9(40)	$\langle 5$–$11\rangle^+$				110				1	1.75						90Ec01
5588.5(21)	$\langle 9\rangle^+$			0.02	80											90Ec01
5615.8(35)	$\langle 5\rangle^-$			0.02	120											90Ec01
5635(5)	X^+				incl											

(continued) **$^{41}_{20}$Ca**

E^* [keV]	$2J^\pi$	$2T$	S_n^+ eval	$S_n'^+$ (d,p)	σ (d,p) μb/sr	S' (d,p)	C^2S (d,p)	S' (d,p)	ℓ_p	S' (τ,d)	σ (α,τ) (α,τ)	S_N (α,τ)	S_n^- eval	C^2S (p,d)	Γ	Ref.
5648.8(13)	$\langle 5\rangle^-$			0.69	1230	1.47	0.12				48	0.27				90Ec01
5670.1(9)	3^-			0.03	800	0.06										90Ec01
5685.9(30)	$\langle 5,7\rangle^-$				60						17	0.08				90Ec01
5704.0(9)	1^-			0.09	1750	0.13										90Ec01
5719.0(11)	$\langle 5\rangle^-$			0.17	410											90Ec01
5728.3(18)	5^+			0.04	40				1	0.20						90Ec01
5750.9(15)	9^+			0.15			0.011				111	0.03				90Ec01
5759.6(11)	$\langle 5\rangle^+$			0.16	1050	0.18			1+3	2.4						90Ec01
5801.2(15)	$\langle 5\rangle^-$			0.49	560	0.65	0.081				25	0.14				90Ec01
5817.2(9)	3^+	3			200				3	3.2				0.97		
5849(5)					170									incl		
5866.1(26)					incl											90Ec01
5891.6(14)	1^-			0.03	820	0.06										90Ec01
5910.1(33)					90						31					90Ec01
5933.2(10)	$\langle 5\rangle^-$			0.06	220											90Ec01
5975.9(12)	$\langle 3,5\rangle^+$			0.06	550				1+3	2.0						90Ec01
5984(5)	1^+				620	0.02								0.14		
6004.6(13)	1^-			0.01	400											90Ec01
6013.0(32)																90Ec01
6036.0(17)	$\langle 9\rangle^+$			0.03	350				1+3	0.9						90Ec01
6065.9(22)	$\langle 5\text{–}11\rangle^+$			doubl	160				1	1.2	119	0.16				90Ec01
6083.3(23)	$\langle 3\rangle^+$			0.04	530											90Ec01
6098.7(14)	5^+				incl				1	0.19						90Ec01
6140.6(16)	$\langle 5,7\rangle^-$			0.03	170											90Ec01
6148.0(30)					100											90Ec01
6164.1(21)																90Ec01
6179.8(13)	1^-			0.04	1120	0.08										90Ec01
6192.9(11)																90Ec01
6208.2(13)	3^-			0.01	140											90Ec01
6238.8(8)	5^-			0.10	220		0.017									90Ec01
6245(5)					incl											
6272.9(12)	5^-			0.01	260											90Ec01
6284.0(17)	$\langle 5\rangle^+$			0.01	incl											90Ec01
6295.9(21)	7^-			0.01	incl											90Ec01
6325(5)	$\langle 5\rangle^+$				500				1	0.62						
6354.1(24)	5^+			0.01	40											90Ec01
6376.7(10)	1^-			0.05	1040	0.07										90Ec01
6400.7(13)	$\langle 9\rangle^+$			0.02	270											90Ec01
6410.9(4)	$\langle 1\text{–}5^+\rangle$				incl											90Ec01
6437.9(7)	5^-			0.26	600											90Ec01
6450.7(14)	5^-			0.24	240		0.061									90Ec01
6462(10)	$\langle 5\text{–}11\rangle^+$				100				1+3	0.47						
6483.4(22)	X^+			doubl	100						22					90Ec01
6520.6(11)	5^-			0.14	300		0.035									90Ec01
6527(7)	$\langle 5\text{–}11\rangle^+$				40				1+3	0.79						

(continued) **$^{41}_{20}$Ca**

E^* [keV]	$2J^\pi$	$2T$	S_n^+ eval	$S_n'^+$ (d,p)	σ (d,p) μb/sr	S' (d,p)	C^2S (d,p)	S' (d,p)	ℓ_p	S' (τ,d)	σ (α,τ) (α,τ)	S_N (α,τ)	S_n^- eval	C^2S (p,d)	Γ	Ref.
6553(10)	X^+				1420	0.22										
6567.4(13)	7^-			0.29			0.037									90Ec01
6602.6(15)	$\langle\geq5\rangle$				240											90Ec01
6614.2(16)	$\langle\geq5\rangle$				200											90Ec01
6628.6(24)				doubl												90Ec01
6647.0(20)	5^-			0.10	300		0.015									90Ec01
6674.3(13)	5^+			0.03	680											90Ec01
6686.2(8)	7^-			0.17			0.031									90Ec01
6729.2(10)	7^-			0.03	240											90Ec01
6738(7)	$\langle5\text{–}11\rangle^+$				630				1+3	0.71						
6748.1(9)	7^-			0.12	200											90Ec01
6792.9(19)	$\langle5\rangle^+$			0.03	200		0.024									90Ec01
6806.7(15)	$\langle3\rangle^+$			0.02	100											90Ec01
6822.3(9)	1^+	3			200											
6826.3(5)	$\langle15,19\rangle$															90Ec01
6851.8(15)	5^+			0.02												90Ec01
6869.5(10)	$\langle5\rangle^-$			0.12			0.016									90Ec01
6901.2(24)	5^+			0.02												90Ec01
6917.3(25)	$\langle9\rangle^+$			0.08												90Ec01
6931.8(19)																90Ec01
6966(15)	$3^+,5^+$															
6990.6(10)	5^-			0.13												90Ec01
7014.8(7)	$\langle9\rangle^+$			0.21			0.025		1+3	0.78						90Ec01
7026.5(15)																90Ec01
7041.0(5)	3^-			0.02												90Ec01
7073.1(25)	1^-			0.03												90Ec01
7092.7(18)	$\langle9\rangle^+$			0.03												90Ec01
7107.8(25)	$\langle5\text{–}11\rangle^-$								0	0.22						90Ec01
7115.8(23)																90Ec01
7137.5(27)	5^+			0.04												90Ec01
7146(4)	7^-	3														
7164.2(21)	$\langle9\rangle^+$			0.05												90Ec01
7176.1(10)	$\langle5,7\rangle^-$													0.09		90Ec01
7190.7(33)	1^-			0.03			0.001									90Ec01
7237.8(23)	5^-			0.06												90Ec01
7267.6(28)	$\langle5\rangle^+$								1	0.95						90Ec01
7295.8(10)	5^-			0.05												90Ec01
7308.4(9)	7^-			0.19			0.032									90Ec01
7340.6(24)	3^+			0.02												90Ec01
7365.3(14)	$\langle5\rangle^-$			0.08												90Ec01
7367(15)	1^+															
7377.1(9)	$\langle5\rangle^-$			0.25			0.009									90Ec01
7392.9(19)	$\langle5\text{–}11\rangle^+$								1	0.81						90Ec01
7417.1(15)	$\langle7,9\rangle^-$								0	0.74						90Ec01
7437.3(11)	5^-			0.33			0.050									90Ec01

(continued) **$^{41}_{20}$Ca**

E^* [keV]	$2J^\pi$	$2T$	S_n^+ eval	$S_n'^+$ (d,p)	σ (d,p) μb/sr	S' (d,p)	C^2S (d,p)	S' (d,p)	ℓ_p	S' (τ,d)	σ (α,τ)	S_N (α,τ)	S_n^- eval	C^2S (p,d)	Γ	Ref.
7440(20)	1^+,X^+															
7459.0(29)	5^-			0.01												90Ec01
7487.5(6)	X^+															90Ec01
7508.8(17)	7^-			0.08												90Ec01
7524.7(14)	7^-			0.05												90Ec01
7533(10)	5^+–11^+								1	0.44						
7537.9(14)	$\langle 5\rangle^-$			0.29			0.049									90Ec01
7553(8)	X^+															
7576.4(21)	X^+								3	2.3						90Ec01
7587(15)	$\langle 5,7\rangle^-$															
7607.6(22)	$\langle 9\rangle^+$			0.08												90Ec01
7631.3(16)	$\langle 9\rangle^+$			0.19			0.012									90Ec01
7657.0(13)	$\langle 1$–$5^+\rangle$															90Ec01
7678.6(20)																90Ec01
7706.7(10)	$\langle \geq 5\rangle$															90Ec01
7731.7(12)	$\langle \geq 5\rangle$															90Ec01
7751.0(9)	1^+															90Ec01
7770.3(14)	1^+													0.04		90Ec01
7817.1(11)	5^-			0.56			0.021									90Ec01
7887.8(11)	5^-			0.04			0.052									90Ec01
7919.1(24)	$\langle 5\rangle^-$			0.08			0.014									90Ec01
7956.8(26)	5^-			0.12			0.012									90Ec01
7974.1(30)	7^-			0.03			0.015									90Ec01
7990(20)	1^+–5^+								1	0.19						
7994.8(32)	$\langle 9\rangle^+$			0.03												90Ec01
8040(10)	$\langle 5$–$11\rangle^+$								1	0.38						
8047.5(17)	$\langle 5\rangle^-$			0.10												90Ec01
8063.4(23)	7^-			0.12												90Ec01
8101.8(14)	7^-			0.02			0.029									90Ec01
8129.7(26)	5^+			0.05												90Ec01
8136.1(16)	$\langle 5\rangle^-$			0.11												90Ec01
8150.8(9)	$\langle 5\rangle^-$			0.15												90Ec01
8179.0(19)	5^+			0.03					1	0.77						90Ec01
8199.7(19)	7^-			0.03			0.031									90Ec01
8229.4(19)	5^+			0.05												90Ec01
8242.2(32)	$\langle 1$–$5^+\rangle$															90Ec01
8258.6(28)																90Ec01
8311(15)	$\langle 3,5\rangle^+$								1	0.13						
8312.7(21)	$\langle 9\rangle^+$			0.02												90Ec01
8335.7(23)	$\langle 5\rangle^-$			0.14												90Ec01
8373.5(18)	5^+			0.04					3+1	2.4				0.07		90Ec01
8397(15)	5^-						0.018									94Uo01
8402.2(21)	$\langle 5$–$11\rangle^+$															90Ec01
8447.4(38)	$\langle 9\rangle^+$			0.08			0.001		1	0.27						90Ec01
8467.4(12)	7^-			0.03												90Ec01

(continued) **$^{41}_{20}$Ca**

E^* [keV]	$2J^\pi$	$2T$	S_n^+ eval	$S_n'^+$ (d,p)	σ (d,p) μb/sr	S' (d,p)	C^2S (d,p)	S' (d,p)	ℓ_p	S' (τ,d)	σ (α,τ)	S_N (α,τ)	S_n^- eval	C^2S (p,d)	Γ	Ref.
8504(10)	$\langle 5\text{–}11\rangle^+$								1	0.27						75Bo04
8522.4(20)	7^-			0.08			0.006									90Ec01
8549.0(27)	5^-			0.15												90Ec01
8551(15)	1^+								1	0.28				0.13		
8584.6(33)	7^-			0.05												90Ec01
8619.6(37)	5^-			0.29			0.021									90Ec01
8630(10)	$\langle 5\text{–}11\rangle^+$								1	0.29						75Bo04
8637.8(39)	5^-			0.33			0.077									90Ec01
8656(10)	$\langle 5\text{–}11\rangle^+$								1	0.15				0.18		75Bo04
8673.5(28)	$\langle 5,7\rangle^-$															90Ec01
8699.6(40)	5^+			0.05					1	0.08						90Ec01
8741(15)																
8783(10)	5^-						0.025									94Uo01
8855(10)	$\langle 9^+\rangle$						0.003									94Uo01
8916(10)	$\langle 3^-,9^+\rangle$						0.001									94Uo01
8980(10)	$\langle 5\rangle^+$								1	0.20						
8997(10)	$\langle 9^+\rangle$						0.002									94Uo01
9047(15)	$\langle 3,5\rangle^+$															
9084(10)	5^-						0.020									94Uo01
9140(15)																
9177(10)	$\langle 5\text{–}11\rangle^+$								1	0.40				0.12		94Uo01
9216(15)																
9273(10)	$\langle 5\text{–}11\rangle^+$						0.001		1	0.39						94Uo01
9315(10)																94Uo01
9375(10)	5^+								1	0.31				0.31		
9420(10)	$\langle 5\text{–}11\rangle^+$								1	0.32						
9475(10)																94Uo01
9555(15)	$\langle 5\text{–}11\rangle^+$								1	0.19						
9650(20)	$\langle 5\text{–}11\rangle^+$								1	0.21						
9720(20)	$\langle 5\text{–}11\rangle^+$								1	0.23						
9880(20)	$\langle 5\text{–}11\rangle^+$								1	0.13						
9910(20)	$\langle 5\text{–}11\rangle^+$								1	0.06						
9920(20)	$\langle 5\text{–}11\rangle^+$								1	0.11						
10177(15)																
10300(20)	$\langle 5\text{–}11\rangle^+$								1	0.20						
10325									1	0.58						
10752(15)																
10859(15)	$\langle 3,5\rangle^+$															
10950(20)	$\langle 3,5\rangle^+$													0.14		
11304															1.0(5)	
11310															1.0(5)	
11320															1.0(5)	
11326															3.0(15)	
11331															0.5(3)	
11336															1.0(5)	

(continued) **$^{41}_{20}$Ca**

E^*	$2J^\pi$	S_n^+	$S_n'^+$	σ (d,p)	S'	C^2S	S'	S'	σ (α,τ)	S_N	S_n^-	C^2S	Γ	Ref.
[keV]		eval	(d,p)	μb/sr	(d,p)	(d,p)	(d,p)	$(\tau$,d)	(α,τ)	(α,τ)	eval	(p,d)		
11344													3.0(15)	
11362													8.5(43)	
11364													7.0(35)	
11381													4.5(23)	
11399													1.5(8)	
11402													2.0(10)	
11409													7.0(35)	
11412													8.0(40)	
11417													5.0(25)	
11426													6.0(30)	
11437													1.0(5)	
11440													8.5(43)	
11447													4.0(20)	
		77En02	90Ec01	65Be14	65Be14		87Ka28		81Fo09		77En02	72Ma23		Ref.
						94Uo01		75Bo04		81Fo09			01Ca59	Ref.

Additional data on this isotope can be found in [02Mi37, 94Uo01, 90Ec01, 89Ra06, 89Ec02, 86Vi02, 86Sa19, 85Vi01, 81Fo09, 75Fo15, 74De42, 72Ko41, 70Yo01, 70Se01, 68Ly01, 68Sm05, 67Be41].

* These values S' were estimated [87Ka28] for calculation of neutron direct capture cross section.

** Two additional ℓ_n=0 states with E^*=5059 and 5082 keV were given in [65Be14]; not included in [90En08].

S_n^+ and S_n^- are from evaluation [77En02] where data from 8 experimental works were used.

Data from the more recent measurements [90Ec01] are given in three columns: σ (d,p) measured at 20° and 30° and the parameter $S_n'^+=S'=G_{\ell j}$; comments on contamination by other isotopes or cases of poor statistics and poor resolution can be found in [90Ec01].

Possible doublets are marked in the column for $S_n'^+$.

Data in [90Ec01] were analyzed by CCBA - Coupled Channel Born Approximation method as well as by DWBA - Distorted Wave Born Approximation method.

Additionally are presented σ (d,p) and S' from [65Be14] as well as C^2S from [94Uo01] and S' for ℓ_n=1 states used in [87Ka28] for estimation of neutron capture cross section. Data from proton transfer reactions $(\tau$,d) [75Bo04] and (α,τ) [81Fo09] are presented for comparison.

Values C^2S from pickup (p,d) reaction [72Ma23] are given in Supplement.

For two low-lying states (J^π=7/2$^-$, 3/2$^+$) parameter C^2S from neutron pickup reactions (p,d) and (d,t) was found to be close to the theoretically expected values 2.0 and 2.67 [71Ra35].

Energy levels and branching ratios [90Ec01, 90En08, 98En04, 01Ca59]. Part 2 **$^{41}_{20}$Ca**

E^*	$2J^\pi$	σ (d,p)	σ (d,p)	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
					E_f^*:	0.0	1943	2010	2462	2576
[keV]		μb/sr	μb/sr	Γ_{cm}	$2J_f^\pi$:	7$^-$	3$^-$	3$^+$	3$^-$	5$^-$
0.0	7$^-$	7230	6300	102(7)·10^3 yr	77En02					
1942.8(2)	3$^-$	6649	2252	0.44(4) ps	77En02	100				
2009.9(2)	3$^+$	334	88	0.504(12) ns	77En02	100				

(continued) **$^{41}_{20}$Ca**

E^*	$2J^\pi$	σ (d,p)	σ (d,p)	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
					E_f^*:	0.0	1943	2010	2462	2576
[keV]		μb/sr	μb/sr	Γ_{cm}	$2J_f^\pi$:	7^-	3^-	3^+	3^-	5^-
2462.3(2)	3^-	2069	852	3.7(7) ps	90Ec01		100			
2576.5(6)	5^-	28	20	0.16(4) ps	90Ec01	100				
2605.6(3)	5^+	16	12	0.35(6) ps	77En02	100				
2670.5(12)	1^+	107	128	2.2(4) ps	77En02		66(1)	34(1)		
2883.9(7)	7^+	80	88	8.1(5) fs	90Ec01	100				
2959.3(6)	7^-	26	26	26(6) fs	77En02	100				
3049.9(2)	3^+	⟨6⟩	⟨6⟩	0.66(23) ps	90Ec01		23(2)	39(2)		
3131(5)										
3201.3(7)	9^+	159	204	31(9) fs	90Ec01	100				
3369.6(1)	11^+	21	23	20.6(8) ps	90Ec01	43(1)				
3400.0(3)	1^+	109	155	82(21) fs	90Ec01			100	<6	
3494.9(4)	5^+	22	7	0.28(6) ps	90Ec01	5(2)		83(3)	<6	
3527.3(9)	3^+	39	31	38(17) fs	90Ec01		55(3)	35(3)		
3613.5(2)	1^-	388	266	0.11(5) ps	90Ec01		51(4)		33(4)	
3614.4(8)	7^+			15(9) fs		100				
3677.0(6)	9^-			45(12) fs		94(1)				
3730.6(3)	3^-	104		45(14) fs	90Ec01	33(1)	12(1)		22(1)	33
3740.4(5)	$\langle 3,5\rangle^+$			<35 fs				66(3)		
3829.8(2)	15^+	12	9	2.95(10) ns	90Ec01					
3845.9(6)	1^+	26	21	0.11(3) ps	90Ec01		20(5)	80(5)		
3914.8(2)	13^+	23		1.45(26) ps	90Ec01					
3920	1^+									
3944.4(3)	1^-	2628		<20 fs	90Ec01		93(2)		7.0(20)	
3974.4(5)	7^+	20		24(10) fs	90Ec01	43(1)				
3976.0(2)	11^+			23(7) fs						
4015.1(8)	11^-	12		10(4) fs	90Ec01	100				
4096.9(7)	5^+	66	29	<21 fs	90Ec01	36(6)		64(6)		
4184.2(5)	⟨3,5⟩			39(12) fs				69(3)		
4277.3(10)	$\langle 5–9\rangle^-$	35	29	<26 fs	90Ec01	100				
4328.0(10)	X^+	6		<110 fs	90Ec01					
4343.1(10)	9^-			0.13(3) ps		100				
4415.0(7)	3^+	4		40(10) fs	90Ec01			70(2)		
4451.0(10)	9^+	132		83(31) fs	90Ec01	x				
4519.6(12)	13^+	5*		<49 fs	90Ec01					
4550.1(10)				92(21) fs		100				
4569(5)										
4603.1(20)	3^-	492		<37 fs	90Ec01		100			
4648(15)										
4728.1(6)	$\langle 3\rangle^+$			<30 fs				100		
4733.0(11)	$\langle 5\rangle^+$	65	65	28(9) fs	90Ec01	18(4)	39(5)		43(6)	
4752.7(3)	1^-	918	462	30(10) fs	90Ec01		67(2)		33(2)	
4778.8(20)	$\langle 3\rangle^+$	165	29	<15 fs	90Ec01			100		
4797(5)	1^+–13^+									
4815.7(16)	5^+	135	43	<37 fs	90Ec01	41(7)				
4830.7(9)	$\langle 3\rangle^+$	51	16		90Ec01					

(continued) **$^{41}_{20}$Ca**

E^* [keV]	$2J^\pi$	σ (d,p) μb/sr	σ (d,p) μb/sr	$T_{1/2}$ or Γ_{cm}	Ref.	E_f^*: $2J_f^\pi$:	Branching ratios in percentage 0.0 7^-	1943 3^-	2010 3^+	2462 3^-	2576 5^-
4882.6(11)	5^-	1010	394	<87 fs	90Ec01		100				
4928(5)											
4974.9(11)	9^+	607	595	49(45) fs	90Ec01		42(19)				
4995.1(18)		7	11		90Ec01						
5010(2)**	1^+	19			90Ec01			x	55(12)		
5046.9(10)	$\langle 9\rangle^+$	36	32		90Ec01						
5057.1(14)	$\langle 5–9\rangle^+$			0.14(7) ps			100				
5072.3(9)	1^-	47	23		90Ec01						
5078.4(25)	1^-	31	12		90Ec01						
5095.3(10)	3^+	59	16		90Ec01						
5120.7(12)	3^-	32	17	0.8(7) ps	90Ec01		41(5)				
5148.1(16)	7^-	39	29		90Ec01						
5154.4(16)		12	7	<125 fs	90Ec01		x				
5194.9(8)	9^+	265	277		90Ec01			x			
5219.1(3)	$\langle 13,17\rangle^+$	6	9	<28 fs	90Ec01						
5283.3(5)	5^+	81		<37 fs	90Ec01				100		
5290.3(13)				<104 fs			100				
5305(4)		4			90Ec01						
5340(2)	$\langle 7–11\rangle^+$	3			90Ec01						
5350(1)	7^-	2			90Ec01						
5370.3(8)	3^-	10			90Ec01						
5411.4(7)	5^+	140		<30 fs	90Ec01			63			
5451.7(11)	1^-	127			90Ec01						
5468.8(9)	3^-	348			90Ec01		x				
5482.2(13)	$\langle 3\rangle^+$	123			90Ec01						
5504.2(9)	5			62(21) fs			x				
5519.9(13)	$\langle 5\rangle^-$	105			90Ec01						
5539.9(40)	$\langle 5–11\rangle^+$	9			90Ec01						
5588.5(21)	$\langle 9\rangle^+$	13	13		90Ec01						
5615.8(35)	$\langle 5\rangle^-$	32	18		90Ec01						
5635(5)	X^+										
5648.8(13)	$\langle 5\rangle^-$	1290	557		90Ec01						
5670.1(9)	3^-	102	50		90Ec01		100				
5685.9(30)	$\langle 5,7\rangle^-$	18	18		90Ec01						
5704.0(9)	1^-	288	147		90Ec01						
5719.0(11)	$\langle 5\rangle^-$	287	125		90Ec01		16	36	36		
5728.3(18)	5^+	113	36		90Ec01						
5750.9(15)	9^+	180	150		90Ec01						
5759.6(11)	$\langle 5\rangle^+$	424	167		90Ec01						
5801.2(15)	$\langle 5\rangle^-$	893	420		90Ec01						
5817.2(9)	3^+			≤28 fs					<3		
5849(5)											
5866.1(26)		5			90Ec01						
5891.6(14)	1^-	105	48		90Ec01						
5910.1(33)		18			90Ec01						

(continued) **$^{41}_{20}$Ca**

E^* [keV]	$2J^\pi$	σ (d,p) μb/sr	σ (d,p) μb/sr	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: $2J_f^\pi$:	0.0 7^-	1943 3^-	2010 3^+	2462 3^-	2576 5^-
5933.2(10)	$\langle 5\rangle^-$	106	36		90Ec01						
5975.9(12)	$\langle 3,5\rangle^+$	166	42		90Ec01				x		x
5984(5)	1^+										
6004.6(13)	1^-	33	14		90Ec01						
6013.0(32)		15	19		90Ec01						
6036.0(17)	$\langle 9\rangle^+$	44	31		90Ec01						
6065.9(22)	$\langle 5–11\rangle^+$	23	35		90Ec01						
6083.3(23)	$\langle 3\rangle^+$	78			90Ec01						
6098.7(14)	5^+	16	10		90Ec01						
6140.6(16)	$\langle 5,7\rangle^-$	42	14		90Ec01						
6148.0(30)		108	8		90Ec01						
6164.1(21)		6			90Ec01						
6179.8(13)	1^-	130	82		90Ec01						
6192.9(11)		5	53		90Ec01						
6208.2(13)	3^-	32			90Ec01						
6238.8(8)	5^-	204	86		90Ec01						
6245(5)											
6272.9(12)	5^-	13	8		90Ec01						
6284.0(17)	$\langle 5\rangle^+$	20	4		90Ec01						
6295.9(21)	7^-	17	6		90Ec01						
6325(5)	$\langle 5\rangle^+$							x			
6354.1(24)	5^+	5			90Ec01						
6376.7(10)	1^-	162	118		90Ec01						
6400.7(13)	$\langle 9\rangle^+$	18	20		90Ec01						
6410.9(4)	$\langle 1–5^+\rangle$	7			90Ec01						
6437.9(7)	5^-	584	240		90Ec01						
6450.7(14)	5^-	525	256		90Ec01						
6462(10)	$\langle 5–11\rangle^+$										
6483.4(22)	X^+	40	19		90Ec01						
6520.6(11)	5^-	292	132		90Ec01						
6527(7)	$\langle 5–11\rangle^+$										
6553(10)	X^+										
6567.4(13)	7^-	695	250		90Ec01						
6602.6(15)	$\langle \geq 5\rangle$	13			90Ec01						
6614.2(16)	$\langle \geq 5\rangle$	10			90Ec01						
6628.6(24)		38	8		90Ec01						
6647.0(20)	5^-	227	83		90Ec01						
6674.3(13)	5^+	101	27		90Ec01						
6686.2(8)	7^-	465	199		90Ec01						
6729.2(10)	7^-	75	40		90Ec01						
6738(7)	$\langle 5–11\rangle^+$										
6748.1(9)	7^-	340	147		90Ec01						
6792.9(19)	$\langle 5\rangle^+$	97	35		90Ec01						
6806.7(15)	$\langle 3\rangle^+$	24	18		90Ec01						
6822.3(9)	1^+			<28 fs					<2		

(continued) **$^{41}_{20}$Ca**

E^* [keV]	$2J^\pi$	σ (d,p) μb/sr	σ (d,p) μb/sr	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage					
						E_f^*:	0.0	1943	2010	2462	2576
						$2J_f^\pi$:	7^-	3^-	3^+	3^-	5^-
6826.3(5)	⟨15,19⟩	7		<1.7 ps	90Ec01						
6851.8(15)	5^+	11			90Ec01						
6869.5(10)	⟨5⟩$^-$	117			90Ec01						
6901.2(24)	5^+	18			90Ec01						
6917.3(25)	⟨9⟩$^+$	99			90Ec01						
6931.8(19)		16			90Ec01						
6966(15)	3^+,5^+										
6990.6(10)	5^-	291			90Ec01						
7014.8(7)	⟨9⟩$^+$	359			90Ec01						
7026.5(15)		47			90Ec01						
7041.0(5)	3^-	50			90Ec01						
7073.1(25)	1^-	100			90Ec01						
7092.7(18)	⟨9⟩$^+$	37			90Ec01						
7107.8(25)	⟨5–11⟩$^-$	11			90Ec01						
7115.8(23)		6			90Ec01						
7137.5(27)	5^+	111			90Ec01						
7146(4)	7^-						65(7)				
7164.2(21)	⟨9⟩$^+$	77			90Ec01						
7176.1(10)	⟨5,7⟩$^-$	25			90Ec01						
7190.7(33)	1^-	93			90Ec01						
7237.8(23)	5^-	159	67		90Ec01						
7267.6(28)	⟨5⟩$^+$	27	3		90Ec01						
7295.8(10)	5^-	145	72		90Ec01						
7308.4(9)	7^-	561	221		90Ec01						
7340.6(24)	3^+	54	10		90Ec01						
7365.3(14)	⟨5⟩$^-$	111			90Ec01						
7367(15)	1^+										
7377.1(9)	⟨5⟩$^-$	252	182		90Ec01						
7392.9(19)	⟨5–11⟩$^+$	366	85		90Ec01						
7417.1(15)	⟨7,9⟩$^-$	227	58		90Ec01						
7437.3(11)	5^-	35			90Ec01						
7440(20)	1^+,X^+										
7459.0(29)	5^-	5			90Ec01						
7487.5(6)	X^+	2			90Ec01						
7508.8(17)	7^-	129			90Ec01						
7524.7(14)	7^-	74			90Ec01						
7533(10)	5^+–11^+										
7537.9(14)	⟨5⟩$^-$	413			90Ec01						
7553(8)	X^+										
7576.4(21)	X^+	3			90Ec01						
7587(15)	⟨5,7⟩$^-$										
7607.6(22)	⟨9⟩$^+$	20			90Ec01						
7631.3(16)	⟨9⟩$^+$	33			90Ec01						
7657.0(13)	⟨1–5^+⟩	27			90Ec01						
7678.6(20)		3			90Ec01						

(continued) **$^{41}_{20}$Ca**

E^* [keV]	$2J^\pi$	σ (d,p) μb/sr	σ (d,p) μb/sr	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: $2J_f^\pi$:	0.0 7^-	1943 3^-	2010 3^+	2462 3^-	2576 5^-
7706.7(10)	$\langle\geq5\rangle$	2			90Ec01						
7731.7(12)	$\langle\geq5\rangle$	11			90Ec01						
7751.0(9)	1^+	81			90Ec01						
7770.3(14)	1^+	32			90Ec01						
7817.1(11)	5^-	1385			90Ec01						
7887.8(11)	5^-	107			90Ec01						
7919.1(24)	$\langle5\rangle^-$	233			90Ec01						
7956.8(26)	5^-	347			90Ec01						
7974.1(30)	7^-	78			90Ec01						
7990(20)	1^+–5^+										
7994.8(32)	$\langle9\rangle^+$	50			90Ec01						
8040(10)	$\langle5$–$11\rangle^+$										
8047.5(17)	$\langle5\rangle^-$	213	100		90Ec01						
8063.4(23)	7^-	560	236		90Ec01						
8101.8(14)	7^-	44	19		90Ec01						
8129.7(26)	5^+	212	76		90Ec01						
8136.1(16)	$\langle5\rangle^-$	325	135		90Ec01						
8150.8(9)	$\langle5\rangle^-$	439	202		90Ec01						
8179.0(19)	5^+	131	36		90Ec01						
8199.7(19)	7^-	110	47		90Ec01						
8229.4(19)	5^+	151	52		90Ec01						
8242.2(32)	$\langle1$–$5^+\rangle$	26			90Ec01						
8258.6(28)		9			90Ec01						
8311(15)	$\langle3,5\rangle^+$										
8312.7(21)	$\langle9\rangle^+$	17			90Ec01						
8335.7(23)	$\langle5\rangle^-$	478	151		90Ec01						
8373.5(18)	5^+	191	40		90Ec01						
8397(15)	5^-				94Uo01						
8402.2(21)	$\langle5$–$11\rangle^+$	124	50		90Ec01						
8447.4(38)	$\langle9\rangle^+$	145	125		90Ec01						
8467.4(12)	7^-	113	63		90Ec01						
8504(10)	$\langle5$–$11\rangle^+$				75Bo04						
8522.4(20)	7^-	339	113		90Ec01						
8549.0(27)	5^-	487	229		90Ec01						
8551(15)	1^+										
8584.6(33)	7^-	163	89		90Ec01						
8619.6(37)	5^-	943	405		90Ec01						
8630(10)	$\langle5$–$11\rangle^+$				75Bo04						
8637.8(39)	5^-	1217	525		90Ec01						
8656(10)	$\langle5$–$11\rangle^+$				75Bo04						
8673.5(28)	$\langle5,7\rangle^-$	6			90Ec01						
8699.6(40)	5^+	170	71		90Ec01						
8741(15)											
8783(10)	5^-				94Uo01						
8855(10)	$\langle9^+\rangle$				94Uo01						

(continued) **$^{41}_{20}$Ca**

E^* [keV]	$2J^\pi$	σ (d,p) μb/sr	σ (d,p) μb/sr	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage				
					E_f^*:	0.0	1943	2010	2462	2576
					$2J_f^\pi$:	7^-	3^-	3^+	3^-	5^-
8916(10)	$\langle 3^-,9^+\rangle$				94Uo01					
8980(10)	$\langle 5\rangle^+$									
8997(10)	$\langle 9^+\rangle$				94Uo01					
9047(15)	$\langle 3,5\rangle^+$									
9084(10)	5^-				94Uo01					
9140(15)										
9177(10)	$\langle 5–11\rangle^+$				94Uo01					
9216(15)										
9273(10)	$\langle 5–11\rangle^+$				94Uo01					
9315(10)					94Uo01					
9375(10)	5^+									
9420(10)	$\langle 5–11\rangle^+$									
9475(10)					94Uo01					
9555(15)	$\langle 5–11\rangle^+$									
9650(20)	$\langle 5–11\rangle^+$									
9720(20)	$\langle 5–11\rangle^+$									
9880(20)	$\langle 5–11\rangle^+$									
9910(20)	$\langle 5–11\rangle^+$									
9920(20)	$\langle 5–11\rangle^+$									
10177(15)										
10300(20)	$\langle 5–11\rangle^+$									
10325										
10752(15)										
10859(15)	$\langle 3,5\rangle^+$									
10950(20)	$\langle 3,5\rangle^+$									
11304										
11310										
11320										
11326										
11331										
11336										
11344										
11362										
11364										
11381										
11399										
11402										
11409										
11412										
11417										
11426										
11437										
11440										
11447										

(continued) **$^{41}_{20}$Ca**

E^*	$2J^\pi$	σ (d,p)	σ (d,p)	$T_{1/2}$ or	Ref.	Branching ratios in percentage					
						E_f^*:	0.0	1943	2010	2462	2576
[keV]		μb/sr	μb/sr	Γ_{cm}		$2J_f^\pi$:	7^-	3^-	3^+	3^-	5^-
		90Ec01	90Ec01		Ref.						
					Ref.						

Energy levels and branching ratios [90Ec01, 90En08, 98En04, 01Ca59]. Part 3 **$^{41}_{20}$Ca**

E^*	$2J^\pi$					Branching ratios in percentage					
		E_f^*:	2606	2670	2884	2959	3050	3201	3370	3400	3740
[keV]		$2J_f^\pi$:	5^+	1^+	7^+	7^-	3^+	9^+	11^+	1^+	$\langle 3,5\rangle^+$
3049.9(2)	3^+		34(3)	4(1)	<3						
3369.6(1)	11^+							57(1)			
3494.9(4)	5^+						12(3)				
3527.3(9)	3^+			10(3)							
3613.5(2)	1^-			16(2)							
3677.0(6)	9^-					5.7(6)					
3740.4(5)	$\langle 3,5\rangle^+$		34(3)								
3829.8(2)	15^+								100		
3845.9(6)	1^+									x	
3914.8(2)	13^+								100		
3974.4(5)	7^+		57(1)								
3976.0(2)	11^+							82(8)	18(8)		
4184.2(5)	$\langle 3,5\rangle$		31(3)								
4328.0(10)	X^+							100			
4415.0(7)	3^+		30(2)								
4519.6(12)	13^+								28(3)		
4815.7(16)	5^+				59(7)						
4974.9(11)	9^+				58(19)						
5010(2)**	1^+									45(12)	
5120.7(12)	3^-			59(5)							
5194.9(8)	9^+		x								
5411.4(7)	5^+		37								
5468.8(9)	3^-						x				
5817.2(9)	3^+		12(2)							16(2)	8(5)
5975.9(12)	$\langle 3,5\rangle^+$		x							x	
6822.3(9)	1^+			38(2)							9(2)
7146(4)	7^-					35(7)					

Energy levels and branching ratios [90Ec01, 90En08, 98En04, 01Ca59]. Part 4 **$^{41}_{20}$Ca**

E^*	$2J^\pi$		Branching ratios in percentage								
		E_f^*:	3830	3846	3915	3976	4097	4184	4415	4728	5219
[keV]		$2J_f^\pi$:	15^+	1^+	13^+	11^+	5^+	$\langle 3,5\rangle$	3^+	$\langle 3\rangle^+$	
4519.6(12)	13^+		29(3)		35(4)	8(2)					
5219.1(3)	$\langle 13,17\rangle^+$		100								
5719.0(11)	$\langle 5\rangle^-$							13			
5817.2(9)	3^+						53(4)			11(2)	
6822.3(9)	1^+			16(2)				7(2)	6(4)	24(2)	
6826.3(5)	$\langle 15,19\rangle$										100

Energy levels and branching ratios [95Th06, 90En08, 98En04, 01Si10]. **$^{42}_{20}$Ca**

E^*	J^π	T	$d\sigma/d\Omega$	ℓ_n	S_n^+	S_n^-	$S_p'^+$	I_p	S'	σ (d,p)	C^2S	σ (τ,α)	C^2S	Ref.
[keV]			μb/sr		eval	eval	eval	arb.u	(d,p)	μb/sr	(p,d)	μb/sr	(τ, α)	
0	0^+		47	3	1.6(2)	0.58(6)	3.2(4)	100(5)	0.91	98	0.50	1270(50)	0.57	77En02
1524.70(3)	2^+		57	1	0.04(2)		0.04(3)	45(3)	0.24	448	0.15	1300(50)	0.17	77En02
				+3	0.48(12)	0.18(3)			2.7					78Vo04
1837.3(3)	0^+		27	3	0.18(5)	0.05(2)	0.3(2)	14(1)	0.21	21	0.04	210(50)	0.05	77En02
2424.17(4)	2^+		29	1	small		0.05(5)	18(1)	3.14	346	0.11	570(50)	0.18	77En02
				+3	0.56(14)	0.16(7)								77En02
2752.4(1)*	4^+			1	0.03(1)	0.01		32(2)	0.32	1054	0.42	2040(50)	0.59	77En02
				+3	0.86(22)	0.59(10)			8.35					78Vo04
3189.4(1)*	6^+		102	3	1.2(3)	0.99(18)		15(1)	17.1	2243	0.66	4560(50)	0.94	77En02
3253.9(1)	4^+			1	small			6.7(4)	2.36	267	incl	incl		77En02
				+3	0.22(6)	0.08(2)								77En02
3300(1)	0^+							1.3(2)	0.10	12				78Vo04
3392(1)	2^+			1	0.01(1)	0.01(1)		3.2(2)	0.04	60				77En02
				+3	0.01(1)	0.01								77En02
3446.9(1)	3^-		152	0	small		0.01(1)	7.1(4)			0.18	380(50)	0.48(5)	77En02
				+2	small		0.28(4)				0.20			77En02
3654(1)	2^+							9.3(5)	0.25	384		150(50)	0.01	78Vo04
									0.42					78Vo04
3780(10)	2^+,3^-													
3885(1)	1^-							2.2(1)						67Wi15
3954.4(1)	4^-		339					1.6(2)	0.01					95Th06
									0.13					75Ha14
3999.7(1)	$\langle 2^+$,3$\rangle$							0.8(1)						67Wi15
4047(2)	3^-		97					1.2(2)	0.01					95Th06
									0.10					75Ha14
4099.7(1)	5^-		384	2	small		0.46(9)	5.8(3)			0.24	490(100)	0.43	77En02
4117(1)	3^-													
4180(2)	0											180(50)		
4232(1)	1							0.8(1)						67Wi15
4342.3(14)	$\langle 0^+$–$4^+\rangle$													

(continued) **$^{42}_{20}$Ca**

E^*	J^π	T	L	$d\sigma/d\Omega$	ℓ_n	S_n^+	S_n^-	$S_p'^+$	I_p	S'	σ (d,p)	C^2S	σ (τ,α)	C^2S	$\Gamma_\alpha\Gamma_\gamma/\Gamma$	Ref.
[keV]			(α,p)	μb/sr		eval	eval	eval	arb.u	(d,p)	μb/sr	(p,d)	μb/sr	(τ, α)		
4354(1)	4^-								1.3(2)	0.35			450(70)	0.12		75Ha14
4418(2)	3^-			162						0.02		0.29				95Th06
										0.32						75Ha14
4443(2)	4^+												290(50)	0.38(4)		
4448.8(17)	2^+								32(2)	1.54	2525					78Vo04
4505(2)	$\langle 2\text{–}4\rangle^+$								0.8(1)	0.07	158					78Vo04
										0.08						78Vo04
4567(2)	$\langle 1,2^+\rangle$								0.9(1)							67Wi15
4666(10)	$\langle 3,4\rangle^-$									0.02						75Ha14
										0.02						75Ha14
4690.1(1)	3^-			132					7.0(4)			0.06	70(50)			95Th06
												0.05				73Du02
4715(1)	$\langle 6^+\rangle$								1.0(3)							67Wi15
4720(10)	$\langle 3,4\rangle^-$									0.02						75Ha14
										0.05						75Ha14
4759.9(3)	2^+								43(2)	1.03	1650					78Vo04
4866(2)	2^+								28(1)	0.72	1277					78Vo04
4896(1)	5^-			393					4.8(7)	0.02						95Th06
4904(2)	3^-									0.29			810(50)			75Ha14
4947(2)	$\langle 1\text{–}3\rangle^-$									0.03			incl			75Ha14
4971(2)	3^-			148					2.7(2)	0.03						95Th06
5017.0(1)	4^+								20(1)	2.43	4210					78Vo04
5075(2)	$\langle 1\text{–}3\rangle^-$			323												95Th06
5158(2)	3^-			131									250(70)			95Th06
5188(2)	$\langle 2\text{–}4\rangle^+$															
5210(2)	$\langle 2^+\rangle$								10(1)	3.78	6042					78Vo04
5214(2)	$\langle 0^+\text{–}4^+\rangle$															
5320(2)	$\langle 3,4\rangle^-$			101						0.03		0.10				95Th06
5345(2)	0^+								9				520(50)			67Wi15
5358(2)	2^+								incl	0.08						75Ha14
5380(2)	5^-			419						0.04						95Th06
5393(2)	$\langle 1\text{–}3\rangle^-$															
5407(4)	3^-									0.02			140(50)			75Ha14
5439(2)	$\langle 3,4\rangle^-$									0.01						75Ha14
5466(5)	$\langle 1\text{–}5\rangle^-$								21(3)							67Wi15
5472(2)	$\langle 2\text{–}4\rangle^+$									1.48	2804					78Vo04
5491(2)	3^-			589												95Th06
5491.2(2)	6^-															
5510(2)	3^-															
5530(2)	2^+									0.09	158					78Vo04
5578(2)	$\langle 0^+\text{–}4^+\rangle$															
5593(2)	3^-			70												95Th06
5601(2)	$\langle 3,4\rangle^-$								8(1)				560(50)			67Wi15
5624(2)	3^-			286						0.03						95Th06
5665(2)	3^-			229					28(2)	0.01						95Th06

(continued) **$^{42}_{20}$Ca**

E^* [keV]	J^π	T	L (α,p)	$d\sigma/d\Omega$ μb/sr	ℓ_n	S_n^+ eval	S_n^- eval	$S_p'^+$ eval	I_p arb.u	S' (d,p)	σ (d,p) μb/sr	C^2S (p,d)	σ (τ,α) μb/sr	C^2S (τ, α)	$\Gamma_\alpha\Gamma_\gamma/\Gamma$	Ref.
										0.02						75Ha14
5670(2)	$\langle 1^-$–$4^+\rangle$								incl				110(120)			
5690(2)	$\langle 4^+,5^-\rangle$												incl			
5716(2)	2^+															
5725(2)	$\langle 2^+$–$6^+\rangle$															
5738(2)	$\langle 1,2^+\rangle$															
5744.3(2)	7^-			287												95Th06
5769(2)	3^-															
5775(2)	$\langle 4,5\rangle^+$									6.88	14530		480(50)			78Vo04
5797(2)	$\langle 1,2\rangle^+$			351												95Th06
5806(2)	3^-											0.06				73Du02
												0.07				73Du02
5822(2)	$\langle 1$–$3\rangle^-$															
5866(2)	0^+			103					97							95Th06
5875(2)	2^+															
5924(2)	$\langle 3,4\rangle^-$			131						0.02						95Th06
										0.02						75Ha14
5927(2)	$\langle 4^+$–$8^+\rangle$															
5952(10)	$\langle 3,4\rangle^-$									0.02						75Ha14
										0.02						75Ha14
5980(5)	3^-															
5994(2)	3^-									0.02						75Ha14
										0.03						75Ha14
6003(2)	$3^-,4^-$									0.02						75Ha14
										0.07						75Ha14
6017(5)	0^+								25							67Wi15
6020(2)	$\langle 4^+$–$6^-\rangle$												350(50)			
6028(2)	$\langle 3\rangle^-$			329						0.01		0.09	incl			95Th06
										0.04		0.11				75Ha14
6038(2)	$\langle 1$–$3\rangle^-$															
6093(2)	$\langle 1$–$3\rangle^-$			260												95Th06
6103(2)																
6113(2)	4^+								12	0.70	1381					78Vo04
6141(2)	6^-															
6145.1(2)	7^-			641												95Th06
6158(3)	3^-									0.02						75Ha14
										0.04						75Ha14
6182(4)	$\langle 1,2^+\rangle$															
6212(2)	$\langle 3,4\rangle^-$									0.05						75Ha14
										0.18						75Ha14
6239(3)	3^-									0.01						75Ha14
										0.03						75Ha14
6248(2)	$\langle 4^+$–$6^+\rangle$															
6273(10)	2^+								17(7)	0.14	181					78Vo04
6315(10)	$\langle 2$–$5\rangle^+$			217						0.33	617		180(100)			95Th06

(continued) **$^{42}_{20}$Ca**

E^* [keV]	J^π	T	L (α,p)	$d\sigma/d\Omega$ μb/sr	ℓ_n	S_n^+ eval	S_n^- eval	$S_p'^+$ eval	I_p arb.u	S' (d,p)	σ (d,p) μb/sr	C^2S (p,d)	σ (τ,α) μb/sr	C^2S (τ, α)	$\Gamma_\alpha\Gamma_\gamma/\Gamma$	Ref.
6392(10)	$\langle 3,4\rangle^-$									0.01						75Ha14
										0.01						75Ha14
6408.9(2)	8^-			219												95Th06
6426(10)	$\langle 2–5\rangle^+$									0.17	360		170(50)			78Vo04
6460(10)	$\langle 3,4\rangle^-$								9.5	0.02						75Ha14
										0.07						75Ha14
6510(10)	$[0^+]$								30	0.26	408		460(50)			67Bj06
6542(2)	5^+															
6554.0(2)	9^-			242						0.17	282	0.12	110(70)			78Vo04
												0.07				73Du02
6585(2)				339						0.15	232					78Vo04
6635(2)	$\langle 4–8\rangle^+$									0.34	471		320(120)			78Vo04
6675(2)	$\langle 4^+–8^+\rangle$												incl			
6700(20)	0^+								28							67Bj06
6715(2)	$\langle 4^+\rangle$									0.07						75Ha14
										0.35						75Ha14
6746(2)	$\langle 3\rangle^+$									0.32	794					78Vo04
6780(10)				254									170(50)			95Th06
6817(2)	$\langle 4,5\rangle^+$								23	1.17	2853					78Vo04
6896(2)	4^+								52	0.20	518					78Vo04
6920(4)	$\langle 3,4\rangle^+$								incl	0.52	1072					78Vo04
6931(7)	$\langle 2,3\rangle^+$			190					incl	0.06						95Th06
										0.14						75Ha14
6940(2)	$\langle 5^-–7^-\rangle$								incl							
6961(15)	$\langle 3,4\rangle^+$									1.06	2247					78Vo04
6975(2)	$\langle 5^+\rangle$			218						0.08						95Th06
7030(10)	4^+			251					11	0.19	572		220(50)			95Th06
										0.37						78Vo04
7041(15)	$\langle 3^-,4^-\rangle$									0.02			incl			75Ha14
										0.06						75Ha14
7103(7)	$\langle 1–4\rangle^-$			206					40							95Th06
7130(2)	4^+								incl	0.36	702					78Vo04
7153(7)	$3^+,4^+$			209						0.38	823					78Vo04
7180(20)	2^+								11							67Bj06
7198(2)										0.02						75Ha14
										0.03						75Ha14
7228(7)	$X^{\langle-\rangle}$								18	0.02						75Ha14
										0.03						75Ha14
7270(15)	$3^+,4^+$									0.91	2184					78Vo04
7282(2)																
7345(2)																
7348(15)	$3^+,4^+$									0.69	1579					78Vo04
7361(2)																
7368.6(2)	10^-															
7389(2)	4^+								78	0.72	1534					78Vo04

(continued) **$^{42}_{20}$Ca**

E^* [keV]	J^π	T	L (α,p)	$d\sigma/d\Omega$ μb/sr	ℓ_n	S_n^+ eval	S_n^- eval	$S_p'^+$ eval	I_p arb.u	S' (d,p)	σ (d,p) μb/sr	σ (τ,α) μb/sr	C^2S (τ,α)	$\Gamma_\alpha\Gamma_\gamma/\Gamma$	E_α^{cm} [keV]	Ref.
7415(2)																
7420(2)												390(50)				
7468(15)										0.06						75Ha14
										0.2						75Ha14
7520(15)	$\langle 3,4\rangle^+$									1.06	2649					78Vo04
7542(2)	$\langle 4^+–7^-\rangle$															
7560(2)										0.02		270(100)				75Ha14
7634(2)	$\langle 4^+\rangle$									0.62	1272					78Vo04
7697(2)	$\langle 4^+\rangle$									0.75	1589					78Vo04
7724(2)																
7750.8(3)	$\langle 11\rangle^-$															
7758(2)	$\langle 6^-\rangle$															
7760(15)	$\langle 3,4\rangle^+$									0.54	1309					78Vo04
7793(15)	$\langle 3,4\rangle^+$									1.78	4628					78Vo04
7801(2)	$\langle 5^–9^-\rangle$															
7838(2)																
7920(2)	$\langle 4^+–8^+\rangle$															
7940(2)	$\langle 4^+–7^-\rangle$															
8050(2)																
8060(2)	$\langle 6^–9^-\rangle$															
8083(2)	$7^–11^-$															
8102(2)																
8170(20)												140(120)				
8297.5(3)	$\langle 11\rangle^-$											140(100)				
8365(2)	$\langle 6^–8^+\rangle$											80(100)				
8450(2)	$\langle 7,8\rangle^-$											210(50)				
8512(2)	$\langle 6^–9^-\rangle$											210(50)				
8517(2)																
8522.4(3)	$8^–12^-$															
8580(2)												140(50)				
8611(2)												incl				
8745(2)	$8^–12^-$															
8774(2)	$\langle 4^+,5^-\rangle$															
8847(2)												140(150)				
8950(2)																
9037(2)	$8^–12^-$															
9114(5)														0.43	2857	
9190(5)														0.42	2933	
9206(2)	$\langle 5^–9^-\rangle$															
9279(5)	1^-													1.49	3022	
9366(5)														0.78	3109	
9378(2)	$\langle 5^–9^-\rangle$															
9424(5)														1.48	3168	
9470(5)														0.83	3213	
9560(5)														0.76	3303	

(continued) **$^{42}_{20}$Ca**

E^* [keV]	J^π	T	L (α,p)	$d\sigma/d\Omega$ μb/sr	ℓ_n	S_n^+ eval	S_n^- eval	$S_p'^+$ eval	I_p arb.u	σ (d,p) μb/sr	C^2S (p,d)	σ (τ,α) μb/sr	C^2S (τ, α)	$\Gamma_\alpha\Gamma_\gamma/\Gamma$	E_α^{cm} [keV]	Ref.
9633(5)														0.53	3377	
9671(5)														0.47	3414	
9760(2)	7^-–11^-															
9770	$\langle 2^+\rangle$															
9779(5)														0.75	3522	
9722(5)														0.75	3465	
9756(5)	$\langle 2^-\rangle$	2									0.05	450(150)	0.32	2.05	3499	
9783(5)														0.75	3526	
9842(2)	$\langle 5,6\rangle^-$															
9850(10)	$\langle 3^-\rangle$	2									0.10	660(150)	0.43			
9869(5)														1.44	3612	
9946(5)														1.74	3689	
10000(10)	$\langle 4^-\rangle$	2									0.17	530(200)	0.50			
10037(5)	$\langle 5^-$–$9^-\rangle$													0.62	3780	
10203(5)														0.85	3947	
10230(5)														0.57	3973	
10281(5)	1^-													2.81	4024	
10313(5)														1.23	4056	
10357(5)	1^-													2.23	4100	
10388(5)														0.99	4131	
10452(5)	$\langle 5^-\rangle$	2									0.23	1680(50)	0.61	1.68	4195	
10498(5)	1^-													2.13	4242	
10526(5)												380(50)		0.50	4269	
10560(5)														0.53	4303	
10587(5)														1.16	4330	
10611(5)												290(50)		0.83	4354	
10631(5)														3.65	4375	
10651(5)														0.45	4394	
10699(5)														0.98	4442	
10725(5)	1^-													1.74	4468	
10782(5)	1^-													2.54	4525	
10804(5)	1^-													4.29	4547	
10841(5)	1^-													5.37	4584	
10883(5)	1^-													2.89	4626	
10904(5)	1^-													2.69	4647	
10915(5)	1^-													2.69	4658	
10967(5)														0.85	4710	
10970											0.10	1190(200)				
10984(5)														0.90	4727	
11011(5)	1^-													3.46	4755	
11047(5)														1.28	4790	
11075(5)	1^-													1.91	4818	
11107(5)	1^-													1.68	4850	
11148(5)	1^-													2.51	4891	
11184(5)	1^-													0.99	4927	

(continued) **$^{42}_{20}$Ca**

E^* [keV]	J^π	T	L (α,p)	$d\sigma/d\Omega$ μb/sr	ℓ_n	S_n^+ eval	$S_p'^+$ eval	σ (d,p) μb/sr	C^2S (p,d)	σ (τ,α) μb/sr	C^2S (τ,α)	$\Gamma_\alpha\Gamma_\gamma/\Gamma$	E_α^{cm} [keV]	$\Gamma_p\Gamma_\gamma/\Gamma$	E_p^{cm} [keV]	Ref.
11222(5)	1^-											2.63	4965			
11235(5)	$\langle 1^+ \rangle$	2														
11278(5)												1.05	5021			
11300(5)												1.21	5043			
11304(1)														1.2(6)	1027	
11310(1)														1.2(6)	1033	
11319(1)														1.2(6)	1043	
11326(1)														3.5(17)	1049	
11331(1)														0.6(3)	1054	
11335(5)	1^-											8.10	5078			
11336(1)														1.2(6)	1059	
11344(1)														3.5(17)	1067	
11361(1)														10(5)	1085	
11363(1)														8(4)	1086	
11377(5)	1^-											2.43	5120			
11381(1)														5(3)	1104	
11398(5)												0.62	5141			
11399(1)														1.8(9)	1122	
11401(1)														2.4(12)	1125	
11409(1)														8(4)	1132	
11412(1)														9(5)	1135	
11417(1)														6(3)	1140	
11427.0(15)														3.1(9)	1150.1	
11430.0(15)														2.6(8)	1153.0	
11432.2(15)														5.6(17)	1155.3	
11435.7(15)														2.8(8)	1158.8	
11440(5)	1^-											1.65	5183			
11440.6(15)	$\langle 3,4 \rangle^-$	2							0.07	1960(50)	0.23			1.9(6)	1163.7	
11444.5(15)														1.9(6)	1167.6	
11447.9(15)														6.8(20)	1171.0	
11449.2(15)														10(3)	1172.3	
11450.6(15)														9.0(27)	1173.8	
11453.3(15)														1.9(6)	1176.4	
11465.0(15)														0.7(2)	1188.0	
11468.3(15)														0.7(2)	1191.4	
11469.5(15)														2.6(7)	1192.6	
11474.0(15)														6.0(18)	1197.0	
11475.9(15)														5.6(17)	1199.1	
11477.9(15)														3.5(11)	1201.0	
11485(5)														7.4(22)	1208.4	
11488(5)	1^-											2.84	5231			
11489(9)														15(5)	1210.0	
11490.5(15)														9.2(28)	1213.6	
11493.8(15)														2.1(6)	1216.9	
11500(5)														1.6(5)	1223.0	

(continued) **$^{42}_{20}$Ca**

E^* [keV]	J^π	T	L (α,p)	$d\sigma/d\Omega$ μb/sr	ℓ_n	S_n^+ eval	S_n^- eval	$S_p'^+$ eval	I_p arb.u	σ (d,p) μb/sr	σ (τ,α) μb/sr	C^2S (τ,α)	$\Gamma_\alpha\Gamma_\gamma/\Gamma$	E_α^{cm} [keV]	$\Gamma_p\Gamma_\gamma/\Gamma$	E_p^{cm} [keV]	Ref.
11501.3(15)															2.4(7)	1224.4	
11503.5(15)															2.8(8)	1226.7	
11505.6(15)															2.7(8)	1228.7	
11509.0(15)															2.4(7)	1232.1	
11511.1(15)															7.1(21)	1234.2	
11513(5)															5.7(17)	1235.6	
11516.7(15)															1.9(6)	1239.9	
11518(5)													0.66	5261			
11518.4(15)															2.9(9)	1241.5	
11523.5(15)															1.1(3)	1247.0	
11525.6(15)															1.8(5)	1248.7	
11527.6(15)															3.9(12)	1250.7	
11529.5(15)															10(3)	1252.6	
11531.2(15)															6.9(20)	1254.3	
11532.7(15)															2.5(8)	1255.9	
11540.1(15)															10(3)	1263.3	
11542.5(15)															14(4)	1265.6	
11543(5)	1^-												1.59	5287			
11543.8(15)															10(3)	1266.9	
11544.5(15)															18(5)	1267.7	
11550.2(15)															2.2(7)	1273.3	
11551.7(15)															2.7(10)	1274.8	
11555.6(15)															6.9(20)	1278.7	
11556.5(15)															12(4)	1279.6	
11558.3(15)															15(5)	1281.4	
11563.0(15)															1.0(3)	1286.1	
11569.3(15)															4.2(13)	1292.0	
11571.9(15)															3.3(10)	1295.0	
11572.9(15)															2.8(8)	1296.1	
11575.4(15)															3.2(9)	1298.5	
11576.4(15)															2.4(7)	1299.5	
11589.9(15)															9.0(27)	1313.1	
11591.3(15)															13(4)	1314.4	
11592.8(15)															13(4)	1316.0	
11594.7(15)															5.4(16)	1318.0	
11596.9(15)															13(4)	1320.0	
11599.6(15)															20(6)	1323.0	
11601.9(15)															16(5)	1325.1	
11603.7(15)															9.3(28)	1326.8	
11611(5)													2.00	5354			
11612.7(15)	1^-														18(5)	1335.8	
11614.1(15)															15(5)	1337.3	
11616.2(15)															17(5)	1339.0	
11621.2(15)															6.0(18)	1344.3	
11633.0(15)															2.1(6)	1356.1	

(continued) **$^{42}_{20}$Ca**

E^* [keV]	J^π	T	L (α,p)	$d\sigma/d\Omega$ μb/sr	ℓ_n	S_n^+ eval	S_n^- eval	$S_p'^+$ eval	σ (d,p) μb/sr	σ (τ,α) μb/sr	C^2S (τ,α)	$\Gamma_\alpha\Gamma_\gamma/\Gamma$	E_α^{cm} [keV]	$\Gamma_p\Gamma_\gamma/\Gamma$	E_p^{cm} [keV]	Ref.
11634.6(15)														12(4)	1357.8	
11636.3(15)														3.5(10)	1359.4	
11637.6(15)														20(6)	1360.7	
11639.5(15)	1^-													27(9)	1362.7	
11641.3(15)														21(6)	1364.4	
11643.6(15)														4.5(14)	1366.8	
11644.4(15)														8.0(24)	1367.5	
11646.4(15)														10(3)	1369.5	
11651.3(15)														4.1(12)	1374.0	
11653.6(15)														2.4(7)	1376.7	
11654.4(15)														4.2(13)	1377.5	
11657.0(15)														20(6)	1380.1	
11660(5)												0.59	5403			
11662.4(15)														15(5)	1385.5	
11665.1(15)														12(4)	1388.2	
11671.1(15)														1.3(4)	1394.2	
11689.4(15)														20(6)	1413.0	
11695.2(15)														34(10)	1418.3	
11697.5(15)														31(10)	1420.6	
11699.9(15)														8.9(27)	1423.0	
11707.7(15)														4.7(14)	1430.8	
11709.3(15)														28(8)	1432.5	
11710.3(15)														40(12)	1433.4	
11718.5(15)														2.6(8)	1441.6	
11727.3(15)														2.2(7)	1450.4	
11728.4(15)														11(3)	1451.5	
11729.4(15)														9.7(29)	1453.0	
11733.1(15)														13(4)	1456.3	
11737.5(15)														12(4)	1460.7	
11738.6(15)														30(9)	1461.7	
11743.6(15)														3.4(10)	1466.7	
11748.2(15)														4.5(14)	1471.3	
11752.5(15)														4.5(14)	1475.6	
11756.8(15)														9.2(28)	1480.0	
11772.9(15)														27(8)	1496.0	
11777.4(15)														16(5)	1500.5	
11778.6(15)														12(4)	1501.8	
11783.1(15)														18(5)	1506.0	
11784.9(15)														18(5)	1508.0	
11786.2(15)														6.7(20)	1509.4	
11787.6(15)														9.3(28)	1510.8	
11790.0(15)														7.6(23)	1513.0	
11795.3(15)														7.0(21)	1518.5	
11798.4(15)	1^-,2^+													210(63)	1521.6	
11805.6(15)	1^-,2^+													12(4)	1529.0	

(continued) **$^{42}_{20}$Ca**

E^* [keV]	J^π	T	L (α,p)	$d\sigma/d\Omega$ μb/sr	ℓ_n	S_n^+ eval	S_n^- eval	$S_p'^+$ eval	I_p arb.u	S' (d,p)	σ (d,p) μb/sr	C^2S (p,d)	σ (τ,α) μb/sr	C^2S (τ, α)	$\Gamma_p\Gamma_\gamma/\Gamma$	E_p^{cm} [keV]	Ref.
11808.4(15)															11(3)	1531.5	
11811.2(15)	1^-,2^+														5.7(17)	1534.4	
11818.2(15)															6.5(20)	1541.3	
11822.6(15)															3.5(11)	1545.7	
11824.1(15)															5.5(17)	1547.0	
11829.2(15)															12(4)	1552.3	
11830.4(15)															34(10)	1553.5	
11831.9(15)															34(10)	1555.0	
11836.5(15)															8.7(26)	1559.7	
11843.5(15)															4.6(14)	1566.6	
11845.0(15)															7.7(23)	1568.2	
11847.0(15)															10(3)	1570.1	
11852.7(15)															11(3)	1575.9	
11856.5(15)															8.8(27)	1579.7	
11865.8(15)															9.8(30)	1588.9	
11871.7(15)															27(8)	1594.8	
11872.9(15)															10(3)	1596.0	
11873.8(15)															12(4)	1597.0	
11885.3(15)															43(13)	1608.5	
11895.5(15)															5.7(17)	1618.6	
11902.1(15)															18(5)	1625.3	
11906.4(15)															29(9)	1629.6	
11910.8(15)															81(24)	1633.9	
11923.5(15)															130(39)	1646.6	
11925.7(15)															88(27)	1648.9	
11933.3(15)															19(6)	1656.4	
11942.0(15)															9.0(27)	1665.2	
11944.6(15)															62(19)	1667.7	
11950.2(15)															83(25)	1673.4	
11959.3(15)															81(25)	1682.5	
11962.9(15)															35(11)	1686.1	
11970.4(15)	1^-														260(78)	1693.5	
11977.0(15)															22(7)	1700.1	
11980.4(15)	1^-														180(54)	1703.6	
11989.2(15)															8.9(27)	1712.3	
11992.2(15)															120(36)	1715.4	
11997(2)																1720	
12000.3(15)															59(18)	1723.5	
12005.2(15)															38(12)	1728.3	
12006.5(15)															53(16)	1729.6	
12012.1(15)															11(3)	1735.3	
12013.8(15)															110(33)	1736.9	
12020.5(15)															130(39)	1743.7	
12029.6(15)															34(10)	1752.8	
12032.6(15)															29(9)	1755.8	

(continued) **$^{42}_{20}$Ca**

E^* [keV]	J^π	T	L (α,p)	$d\sigma/d\Omega$ μb/sr	ℓ_n	S_n^+ eval	S_n^- eval	$S_p'^+$ eval	I_p arb.u	S' (d,p)	σ (d,p) μb/sr	C^2S (p,d)	σ (τ,α) μb/sr	C^2S (τ, α)	$\Gamma_p\Gamma_\gamma/\Gamma$	E_p^{cm} [keV]	Ref.
12040.0(15)															9.4(28)	1763.1	
12042.0(15)															8.2(25)	1765.1	
12043.0(15)															16(5)	1766.1	
12051.1(15)															23(7)	1774.2	
12052.2(15)															43(13)	1775.3	
12061.9(15)															17(5)	1785.1	
12066.3(15)															7.7(23)	1789.5	
12070.2(15)															39(12)	1793.4	
12071.6(15)															25(8)	1794.7	
12078(2)																1801	
12083.0(15)															34(10)	1806.1	
12085.4(15)															18(5)	1808.5	
12092.1(15)															41(12)	1815.2	
12099(2)																1823	
12101.5(15)	1^-														70(20)	1824.6	
12105.0(15)															19(6)	1828.0	
12109(2)																1832	
12112.4(15)	1^-														39(12)	1835.5	
12116.7(15)															240(72)	1839.8	
12123.9(15)															24(7)	1847.0	
12128.0(15)															200(60)	1851.0	
12135.3(15)															130(39)	1858.5	
12138.1(15)															110(33)	1861.2	
12144.9(15)															36(11)	1868.0	
12146.9(15)															87(26)	1870.1	
12148.7(15)															66(20)	1871.8	
12153.9(15)															53(16)	1877.0	
12158.8(15)	1^-														150(45)	1881.9	
12163.3(15)	1^-														240(72)	1886.4	
12168(3)	$\langle 1^- \rangle$															1891	
12171(2)																1894	
12175.8(15)	1^-														220(66)	1899.0	
12183.0(15)	1^-														110(33)	1906.1	
12187.9(15)															32(10)	1911.0	
12194(2)																1917	
12203.2(15)															13(4)	1926.3	
12204.3(15)															19(6)	1927.4	
12208.1(15)															19(6)	1931.2	
12210.6(15)															26(8)	1933.7	
12212.4(15)															25(8)	1935.5	
12221.1(15)															5.1(15)	1944.3	
12222.9(15)															5.1(15)	1946.0	
12226.4(15)															250(75)	1949.6	
12230.7(15)															250(75)	1953.8	
12238.5(15)															14(4)	1961.7	

(continued) **$^{42}_{20}$Ca**

E^*	J^π	T	L	$d\sigma/d\Omega$	ℓ_n	S_n^+	S_n^-	$S_p'^+$	I_p	S'	σ (d,p)	C^2S	σ (τ,α)	C^2S	$\Gamma_p\Gamma_\gamma/\Gamma$	E_p^{cm}	Ref.
[keV]			(α,p)	μb/sr		eval	eval	eval	arb.u	(d,p)	μb/sr	(p,d)	μb/sr	(τ, α)		[keV]	
12239.6(15)															20(6)	1962.7	
12246.5(15)															20(6)	1969.7	
12248.0(15)															24(7)	1971.0	
12252.0(15)															130(39)	1975.1	
12260.4(15)															23(7)	1983.5	
12265.0(15)															31(9)	1988.0	
12268.0(15)															120(36)	1991.0	
12272.0(15)															180(54)	1995.1	
12277.4(15)															50(15)	2000.5	
12278.8(15)															70(21)	2002.0	
12286.0(15)															270(81)	2009.0	
12288.0(15)															110(33)	2011.0	
12291.4(15)															78(24)	2014.6	
12295.0(15)															57(17)	2018.2	
12298.7(15)															78(24)	2021.9	
12300.8(15)															58(17)	2023.9	
12305.1(15)															250(75)	2028.2	
12308.0(15)															74(22)	2031.0	
12311.0(15)															79(24)	2034.2	
12320.8(15)															200(60)	2043.9	
12323.3(15)															210(60)	2046.5	
12327.2(15)															160(50)	2050.3	
12331(2)																2054	
12338(2)																2061	
12344(2)																2068	
12355(3)	1^-														2.5	2078	
12372(3)															<3.0	2095	
12375(3)															<3.0	2098	
12382(3)															3.0	2105	
12384(3)															<3.0	2108	
12389(3)															1.7	2112	
12397(3)	3^-														2.8	2120	
12405(3)															1.7	2128	
12413(3)	0^+														3.5	2136	
12432(3)															<2.0	2155	
12437(3)	1^-														<3.5	2160	
12449(3)																2172	
12462(3)															<7.5	2185	
12505(3)															<4.5	2228	
12517(3)	1^-														2.8	2240	
12532(3)																2255	
12544(10)															8	2267	
12553(3)																2276	
12576(3)																2299	
12583(10)															20	2306	

(continued) **$^{42}_{20}$Ca**

E^*	J^π	T	L	$d\sigma/d\Omega$	ℓ_n	S_n^+	S_n^-	$S_p'^+$	I_p	S'	σ (d,p)	C^2S	σ (τ,α)	C^2S	$\Gamma_p\Gamma_\gamma/\Gamma$	E_p^{cm}	Ref.
[keV]			(α,p)	μb/sr		eval	eval	eval	arb.u	(d,p)	μb/sr	(p,d)	μb/sr	(τ, α)		[keV]	
12601(3)																2324	
12608(10)																2331	
12623(3)																2346	
12652(3)																2375	
12661(3)																2384	
12669(10)	[1$^-$]															2392	
12678(10)																2401	
12687(3)																2410	
12696(10)															10	2419	
12724(10)															60	2447	
12756(10)	[1$^-$]															2480	
12823(10)															20	2546	
12834(10)															10	2557	
12845(10)															20	2568	
12853(10)															20	2576	
12866(10)															20	2589	
12880(10)															20	2604	
12893(10)															20	2616	
12912(10)															20	2635	
12921(10)															20	2644	
12932(10)															30	2655	
12936(10)																2659	
12943(10)															40	2666	
12957(10)															30	2681	
12973(10)															30	2696	
12994(10)															30	2717	
13000(10)	[1$^-$]														30	2724	
13052(10)															50	2775	
13095(10)															20	2818	
13119(10)															50	2842	
13129(10)															40	2852	
13138(10)															30	2861	
13147(10)	[1$^-$]														40	2870	
13168(10)															40	2891	
13195(10)															60	2918	
13202(10)																2925	
13223(10)															110	2946	
13267(10)															60	2990	
13289(10)															80	3013	
13318(10)															40	3041	
13344(10)															210	3067	
13354(10)															120	3077	
13377(10)															90	3100	
13396(10)															70	3119	
13425(10)															110	3148	

(continued) **$^{42}_{20}$Ca**

E^* [keV]	J^π	$d\sigma/d\Omega$ μb/sr	S'^+_p eval	I_p arb.u	S' (d,p)	σ (d,p) μb/sr	C^2S (p,d)	σ (τ,α) μb/sr	C^2S (τ,α)	$\Gamma_\alpha\Gamma_\gamma/\Gamma$	E^{cm}_α [keV]	$\Gamma_p\Gamma_\gamma/\Gamma$	E^{cm}_p [keV]	Ref.
13461(10)												70	3184	
13498(10)												110	3221	
13518(10)												60	3241	
13533(10)												80	3257	
13468(10)												80	3191	
13585(10)												70	3308	
13598(10)												100	3321	
13610(10)												120	3333	
14700(50)	0^+													
			77En02	67Bj06	78Vo04		73Du02	69Ly02		01Si10		01Si10		
		95Th06				78Vo04	73Du02		69Ly02		01Si10		01Si10	

Additional data on this isotope can be found in [03Sc21, 03La04, 97Be45, 85Vi01, 83Sa15, 80St17, 77Bo16, 77Cl01, 74Pe03, 73Ja17, 71Pe04, 70De10, 70De11, 68Bu03, 67Bj06, 67Wi15, 67Na10, 66Si0A, 63Si13, 61Sh09].

Abundance: 0.647(23) %.

* This state is clearly seen in the (α,^{2}He) reaction confirming its $(f_{7/2})^2$ character [78Ja10].

Parameters $d\sigma/d\Omega$ of three-nucleon transfer reaction ^{39}K(α,p)^{42}Ca [95Th06] are given in the first column.

Data from 7 experiments were used in [77En02] for evaluation of parameters S^+_n,S^-_n and S'^+_p.

Proton yield I_p [67Bj06], integer σ and differential cross sections of two-neutron transfer (t,p) reaction [67Wi15] are given together; data for the (d,p) stripping reaction [78Vo04] are given next, additional values σ (d,p) can be found in [75Ha14].

Parameters $(2J+1)C^2S$ and cross sections of one-neutron pickup reactions (p,d) [73Du02] and (τ,α) [69Ly02] are given at right; analogous data from (d,t) reaction can be found in [73Ja17]; L-values for reactions (t,p), (d,p) and (p,d) are given in Supplement;

For two low-lying states (J^π=7/2$^-$, 3/2$^+$) parameter C^2S from neutron pickup reactions (p,d) and (d,t) was found to be close to the theoretically expected values 4.0 and 3.2 [71Ra35].

Parameters $(2J+1)C^2S$ of one-proton transfer (τ,d) reaction are from [70Fo04] (see other data in [73Ja17,71Pe04].

Cross sections of two-proton transfer reaction (τ,n) at 0° are from [74Pe03] (see data for 15° there). Values σ (τ,n)=780 μb/sr (R=$\sigma_{exp}/\sigma_{DWBA}$=2.7), <30 μb/sr and 120 μb/sr (R=0.17) for the levels at 0.0, 1840 and 14700 keV were measured at 0° and 25° by the time-of-flight method [77Bo16] (see Supplement).

Parameters of (d,t) and (p,t) reactions can be found in [73Ja17, 01Si10].

For seven low-lying states (n,n) configurations were determined by the study of the (α,^{2}He) reaction [90Fi07].

Data for this isotope are considered in vol. LB I/18A.

Energy levels and branching ratios [95Th06, 90En08, 98En04, 01Si10]. Part 2

$^{42}_{20}$Ca

E^*	J^π	ℓ_p	L	σ	σ (t,p)	L	S'	L	σ (τ,n)	$T_{1/2}$ or	Ref.	Branching ratios in percentage			
												E_f^*: 0	1525	1837	2424
[keV]			(t,p)	μb	μb/sr	(d,p)	(τ,d)	(p,d)	μb/sr	Γ_{cm}		J_f^π: 0^+	2^+	0^+	2^+
0	0^+	2	0	1240	1450	3	2.90	3	810	Stable	77En02				
1524.70(3)	2^+	2	2	1220	426	1		3	<20	0.82(2) ps	77En02	100			
						+3					78Vo04				
1837.3(3)	0^+	2	0	161	135	3		3	40	387(6) ps	77En02	x	100(2)		
2424.17(4)	2^+	2	2	534	159	3		3	30	140(40) fs	77En02	30(1)	70(1)	<0.5	
											77En02				
2752.4(1)*	4^+		4	747	201	1		3		3.0(4) ps	77En02		99(1)		1.0(4)
						+3					78Vo04				
3189.4(1)*	6^+			366	82	3		2		5.36(8) ns	77En02				
3253.9(1)	4^+			160		3				130(20) fs	77En02		55(5)		10(5)
											77En02				
3300(1)	0^+					3				>0.9 ps	78Vo04		8(2)		92(2)
3392(1)	2^+		2			1			50	130(20) fs	77En02	40(2)	43(4)	7(1)	10(5)
											77En02				
3446.9(1)	3^-	1	3	184	56		2.11	0		250(95) fs	77En02	<2.0	60(2)		35(2)
		+3						+2			77En02				
3654(1)	2^+		2	268	118	1		$\langle 1 \rangle$	30	50(35) fs	78Vo04	18(1)	74(2)	5(3)	3(1)
						+3					78Vo04				
3780(10)	2^+,3^-														
3885(1)	1^-										67Wi15	60(7)		40(7)	
3954.4(1)	4^-					0	4.17			3.3(2) ps	95Th06				
						+2					75Ha14				
3999.7(1)	$\langle 2^+,3 \rangle$										67Wi15		64(3)		30(3)
4047(2)	3^-					0				175(40) fs	95Th06		56(6)		17(6)
						+2					75Ha14				
4099.7(1)	5^-	3		100	≈20		5.91	2		430(70) fs	77En02				
4117(1)	3^-												62(7)		
4180(2)	0														
4232(1)	1										67Wi15	78(3)			22(3)
4342.3(14)	$\langle 0^+$–$4^+ \rangle$														100
4354(1)	4^-					2				480(55) fs	75Ha14				
4418(2)	3^-					0	1.78	2			95Th06		52(7)		13(4)
						2					75Ha14				
4443(2)	4^+														13(3)
4448.8(17)	2^+		2	936	305	1					78Vo04	23(5)	35(6)	17(4)	
4505(2)	$\langle 2$–$4 \rangle^+$					1					78Vo04		47(6)		
						+3					78Vo04				
4567(2)	$\langle 1,2^+ \rangle$										67Wi15				68(6)
4666(10)	$\langle 3,4 \rangle^-$					0					75Ha14				
						+2					75Ha14				
4690.1(1)	3^-		3				0.43	0			95Th06		82(5)		18(5)
								+2			73Du02				
4715(1)	$\langle 6^+ \rangle$									85(30) fs	67Wi15				
4720(10)	$\langle 3,4 \rangle^-$					0					75Ha14				
						+2					75Ha14				

(continued)

$^{42}_{20}$Ca

E^* [keV]	J^π	ℓ_p	L (t,p)	σ μb	σ (t,p) μb/sr	L (d,p)	S' (τ,d)	L (p,d)	σ (τ,n) μb/sr	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: 0 J_f^π: 0^+	1525 2^+	1837 0^+	2424 2^+
4759.9(3)	2^+		2	1254	498	1					78Vo04	35(10)	30(10)	15(5)	20(10)
4866(2)	2^+		2	754	345	1					78Vo04		18(7)		82(7)
4896(1)	5^-					0	0.61			50(14) fs	95Th06				
4904(2)	3^-					2					75Ha14	55(10)			25(5)
4947(2)	$\langle 1–3\rangle^-$					$\langle 1\rangle$					75Ha14				100
4971(2)	3^-		2,3			0	0.12				95Th06		33(6)		35(6)
5017.0(1)	4^+		4	535	133	1					78Vo04		16(5)		
5075(2)	$\langle 1–3\rangle^-$						0.60				95Th06				
5158(2)	3^-						0.17				95Th06		54(9)		46(9)
5188(2)	$\langle 2–4\rangle^+$														
5210(2)	$\langle 2^+\rangle$		2	250	≈55	1					78Vo04				
5214(2)	$\langle 0^+–4^+\rangle$											x	24(5)		15(4)
5320(2)	$\langle 3,4\rangle^-$					0		2			95Th06				
5345(2)	0^+										67Wi15		100		
5358(2)	2^+			≈170		1					75Ha14	75(15)			25(15)
5380(2)	5^-					$\langle 2\rangle$	0.33				95Th06				
5393(2)	$\langle 1–3\rangle^-$												75(9)		25(9)
5407(4)	3^-					0					75Ha14				
5439(2)	$\langle 3,4\rangle^-$					0					75Ha14				
5466(5)	$\langle 1–5\rangle^-$										67Wi15				
5472(2)	$\langle 2–4\rangle^+$			561	133	1					78Vo04		10(3)		
5491(2)	3^-										95Th06		31(9)		
5491.2(2)	6^-									60(14) fs					
5510(2)	3^-						0.65								
5530(2)	2^+					1					78Vo04		30(9)		70(9)
5578(2)	$\langle 0^+–4^+\rangle$														
5593(2)	3^-										95Th06		25(7)		27(4)
5601(2)	$\langle 3,4\rangle^-$						0.50				67Wi15				
5624(2)	3^-					0					95Th06	38(9)			
5665(2)	3^-					0	0.29				95Th06				32(6)
						+2					75Ha14				
5670(2)	$\langle 1^-–4^+\rangle$												44(9)		
5690(2)	$\langle 4^+,5^-\rangle$														
5716(2)	2^+														
5725(2)	$\langle 2^+–6^+\rangle$														
5738(2)	$\langle 1,2^+\rangle$														
5744.3(2)	7^-									415(95) fs	95Th06				
5769(2)	3^-														37(7)
5775(2)	$\langle 4,5\rangle^+$			370	≈80	1					78Vo04				
5797(2)	$\langle 1,2\rangle^+$										95Th06	33(7)	28(6)		39(7)
5806(2)	3^-						0.36	0			73Du02				
								2			73Du02				
5822(2)	$\langle 1–3\rangle^-$														100
5866(2)	0^+		0	1450	1850						95Th06		45(10)	55(10)	
5875(2)	2^+														71(9)

(continued) **$^{42}_{20}$Ca**

E^* [keV]	J^π	ℓ_p	L (t,p)	σ μb	σ (t,p) μb/sr	L (d,p)	S' (τ,d)	L (p,d)	σ (τ,n) μb/sr	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: 0 J_f^π: 0^+	1525 2^+	1837 0^+	2424 2^+
5924(2)	$\langle 3,4\rangle^-$					0					95Th06				
						+2					75Ha14				
5927(2)	$\langle 4^+–8^+\rangle$														
5952(10)	$\langle 3,4\rangle^-$					0					75Ha14				
						+2					75Ha14				
5980(5)	3^-														
5994(2)	3^-					0					75Ha14				83(5)
						+2					75Ha14				
6003(2)	3^-,4^-					0					75Ha14				
						+2					75Ha14				
6017(5)	0^+		0	421	573						67Wi15				
6020(2)	$\langle 4^+–6^-\rangle$														
6028(2)	$\langle 3\rangle^-$					0		0			95Th06		16(5)		
						+2		+2			75Ha14				
6038(2)	$\langle 1–3\rangle^-$												75(6)		25(6)
6093(2)	$\langle 1–3\rangle^-$										95Th06				
6103(2)													44(8)		56(8)
6113(2)	4^+		4	226	56	1					78Vo04				
6141(2)	6^-									50(17) fs					
6145.1(2)	7^-									<70 fs	95Th06				
6158(3)	3^-					0					75Ha14				
						+2					75Ha14				
6182(4)	$\langle 1,2^+\rangle$											32(9)	68(9)		
6212(2)	$\langle 3,4\rangle^-$					0					75Ha14				
						+2					75Ha14				
6239(3)	3^-					0					75Ha14				
						+2					75Ha14				
6248(2)	$\langle 4^+–6^+\rangle$														
6273(10)	2^+		2	≈400		1					78Vo04				
6315(10)	$\langle 2–5\rangle^+$					1					95Th06				
6392(10)	$\langle 3,4\rangle^-$					0					75Ha14				
						+2					75Ha14				
6408.9(2)	8^-									31(3) ps	95Th06				
6426(10)	$\langle 2–5\rangle^+$					1					78Vo04				
6460(10)	$\langle 3,4\rangle^-$					0					75Ha14				
						+2					75Ha14				
6510(10)	$[0^+]$			500	≈300	1					67Bj06				
6542(2)	5^+														
6554.0(2)	9^-					1		0		42(3) ps	78Vo04				
								+2			73Du02				
6585(2)						1					78Vo04				
6635(2)	$\langle 4–8\rangle^+$					1				35(14) fs	78Vo04				
6675(2)	$\langle 4^+–8^+\rangle$														
6700(20)	0^+										67Bj06		x		x
6715(2)	$\langle 4^+\rangle$			400		$\langle 1\rangle$					75Ha14				

(continued) **$^{42}_{20}$Ca**

E^* [keV]	J^π	ℓ_p	L (t,p)	σ μb	σ (t,p) μb/sr	L (d,p)	S' (τ,d)	L (p,d)	σ (τ,n) μb/sr	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E^*_f: 0 1525 1837 2424 J^π_f: 0^+ 2^+ 0^+ 2^+
						+⟨3⟩					75Ha14	
6746(2)	$\langle 3\rangle^+$					1					78Vo04	
6780(10)											95Th06	
6817(2)	$\langle 4,5\rangle^+$					1					78Vo04	
6896(2)	4^+					1					78Vo04	
6920(4)	$\langle 3,4\rangle^+$			1110	437	1					78Vo04	
6931(7)	$\langle 2,3\rangle^+$					1					95Th06	
						+3					75Ha14	
6940(2)	$\langle 5^-$–$7^-\rangle$											
6961(15)	$\langle 3,4\rangle^+$					1					78Vo04	
6975(2)	$\langle 5^+\rangle$					⟨1⟩					95Th06	
7030(10)	4^+					1					95Th06	
						+3					78Vo04	
7041(15)	$\langle 3^-,4^-\rangle$					⟨0⟩					75Ha14	
						+⟨2⟩					75Ha14	
7103(7)	$\langle 1$–$4\rangle^-$										95Th06	
7130(2)	4^+			700		1					78Vo04	
7153(7)	$3^+,4^+$					1					78Vo04	
7180(20)	2^+										67Bj06	
7198(2)						⟨0⟩					75Ha14	
						+⟨2⟩					75Ha14	
7228(7)	$X^{\langle -\rangle}$					⟨0⟩					75Ha14	
						+⟨2⟩					75Ha14	
7270(15)	$3^+,4^+$			300	≈80	1					78Vo04	
7282(2)												
7345(2)												
7348(15)	$3^+,4^+$					1					78Vo04	
7361(2)												
7368.6(2)	10^-									1.9(6) ps		
7389(2)	4^+			1770	637	1					78Vo04	
7415(2)												
7420(2)												
7468(15)						⟨1⟩					75Ha14	
						+⟨3⟩					75Ha14	
7520(15)	$\langle 3,4\rangle^+$					1					78Vo04	
7542(2)	$\langle 4^+$–$7^-\rangle$											
7560(2)						⟨1⟩					75Ha14	
7634(2)	$\langle 4^+\rangle$					1					78Vo04	
7697(2)	$\langle 4^+\rangle$					1					78Vo04	
7724(2)												
7750.8(3)	$\langle 11\rangle^-$									<2 ps		
7758(2)	$\langle 6^-\rangle$											
7760(15)	$\langle 3,4\rangle^+$					1					78Vo04	
7793(15)	$\langle 3,4\rangle^+$					1					78Vo04	
7801(2)	$\langle 5^-$–$9^-\rangle$											

(continued) **$^{42}_{20}$Ca**

E^*	J^π	ℓ_p	L	σ	σ (t,p)	L	S'	L	σ (τ,n)	$T_{1/2}$ or Ref.	Branching ratios in percentage			
											E_f^*: 0	1525	1837	2424
[keV]			(t,p)	μb	μb/sr	(d,p)	(τ,d)	(p,d)	μb/sr	Γ_{cm}	J_f^π: 0^+	2^+	0^+	2^+
7838(2)														
7920(2)	$\langle 4^+–8^+\rangle$													
7940(2)	$\langle 4^+–7^-\rangle$													
8050(2)														
8060(2)	$\langle 6^–9^-\rangle$													
8083(2)	$7^–11^-$													
8102(2)														
8170(20)														
8297.5(3)	$\langle 11\rangle^-$									<1.7 ps				
8365(2)	$\langle 6^–8^+\rangle$													
8450(2)	$\langle 7,8\rangle^-$													
8512(2)	$\langle 6^–9^-\rangle$													
8517(2)														
8522.4(3)	$8^–12^-$													
8580(2)														
8611(2)														
8745(2)	$8^–12^-$													
8774(2)	$\langle 4^+,5^-\rangle$													
8847(2)														
8950(2)														
9037(2)	$8^–12^-$													
9114(5)											67Na10			
9190(5)											67Na10			
9206(2)	$\langle 5^–9^-\rangle$													
9279(5)	1^-										67Na10			
9366(5)											67Na10			
9378(2)	$\langle 5^–9^-\rangle$													
9424(5)											67Na10			
9470(5)											67Na10			
9560(5)											67Na10			
9633(5)											67Na10			
9671(5)											67Na10			
9760(2)	$7^–11^-$													
9770	$\langle 2^+\rangle$													
9779(5)											67Na10			
9722(5)											67Na10			
9756(5)	$\langle 2^-\rangle$							2			73Du02			
9783(5)											67Na10			
9842(2)	$\langle 5,6\rangle^-$													
9850(10)	$\langle 3^-\rangle$							2			73Du02			
9869(5)											67Na10			
9946(5)											67Na10			
10000(10)	$\langle 4^-\rangle$							2			73Du02			
10037(5)	$\langle 5^–9^-\rangle$										67Na10			
10203(5)											67Na10			

(continued) **$^{42}_{20}$Ca**

E^*	J^π	ℓ_p	L	σ	σ (t,p)	L	S'	L	σ (τ,n)	$T_{1/2}$ orRef.	Branching ratios in percentage			
											E_f^*:	0	1525	1837	2424
[keV]			(t,p)	μb	μb/sr	(d,p)	(τ,d)	(p,d)	μb/sr	Γ_{cm}	J_f^π:	0^+	2^+	0^+	2^+
10230(5)												67Na10			
10281(5)	1^-											67Na10			
10313(5)												67Na10			
10357(5)	1^-											67Na10			
10388(5)												67Na10			
10452(5)	$\langle 5^- \rangle$							2				67Na10			
10498(5)	1^-											67Na10			
10526(5)												67Na10			
10560(5)												67Na10			
10587(5)												67Na10			
10611(5)												67Na10			
10631(5)												67Na10			
10651(5)												67Na10			
10699(5)												67Na10			
10725(5)	1^-											67Na10			
10782(5)	1^-											67Na10			
10804(5)	1^-											67Na10			
10841(5)	1^-											67Na10			
10883(5)	1^-											67Na10			
10904(5)	1^-											67Na10			
10915(5)	1^-											67Na10			
10967(5)												67Na10			
10970								0				73Du02			
10984(5)												67Na10			
11011(5)	1^-											67Na10			
11047(5)												67Na10			
11075(5)	1^-											67Na10			
11107(5)	1^-											67Na10			
11148(5)	1^-											67Na10			
11184(5)	1^-											67Na10			
11222(5)	1^-											67Na10			
11235(5)	$\langle 1^+ \rangle$														
11278(5)												67Na10			
11300(5)												67Na10			
11304(1)												63Si13			
11310(1)												63Si13			
11319(1)												63Si13			
11326(1)												63Si13			
11331(1)												63Si13			
11335(5)	1^-											67Na10			
11336(1)												63Si13			
11344(1)												63Si13			
11361(1)												63Si13			
11363(1)												63Si13			
11377(5)	1^-											67Na10			

(continued) **$^{42}_{20}$Ca**

E^*	J^π	ℓ_p	L	σ	σ (t,p)	L	S'	L	σ (τ,n)	$T_{1/2}$ orRef.	Branching ratios in percentage			
											E_f^*: 0	1525	1837	2424
[keV]			(t,p)	μb	μb/sr	(d,p)	(τ,d)	(p,d)	μb/sr	Γ_{cm}	J_f^π: 0^+	2^+	0^+	2^+
11381(1)											63Si13			
11398(5)											67Na10			
11399(1)											63Si13			
11401(1)											63Si13			
11409(1)											63Si13			
11412(1)											63Si13			
11417(1)											63Si13			
11427.0(15)											70De10			
11430.0(15)											70De10			
11432.2(15)											70De10			
11435.7(15)											70De10			
11440(5)	1^-										67Na10			
11440.6(15)	$\langle 3,4\rangle^-$							0			73Du02			
11444.5(15)											70De10			
11447.9(15)											70De10			
11449.2(15)											70De10			
11450.6(15)											70De10			
11453.3(15)											70De10			
11465.0(15)											70De10			
11468.3(15)											70De10			
11469.5(15)											70De10			
11474.0(15)											70De10			
11475.9(15)											70De10			
11477.9(15)											70De10			
11485(5)											70De10			
11488(5)	1^-										67Na10			
11489(9)											70De10			
11490.5(15)											70De10			
11493.8(15)											70De10			
11500(5)											70De10			
11501.3(15)											70De10			
11503.5(15)											70De10			
11505.6(15)											70De10			
11509.0(15)											70De10			
11511.1(15)											70De10			
11513(5)											70De10			
11516.7(15)											70De10			
11518(5)											67Na10			
11518.4(15)											70De10			
11523.5(15)											70De10			
11525.6(15)											70De10			
11527.6(15)											70De10			
11529.5(15)											70De10			
11531.2(15)											70De10			
11532.7(15)											70De10			

(continued) **$^{42}_{20}$Ca**

E^*	J^π	ℓ_p	L	σ	σ (t,p)	L	S'	L	σ (τ,n)	$T_{1/2}$ orRef.	Branching ratios in percentage				
											E_f^*:	0	1525	1837	2424
[keV]			(t,p)	μb	μb/sr	(d,p)	(τ,d)	(p,d)	μb/sr	Γ_{cm}	J_f^π:	0^+	2^+	0^+	2^+
11540.1(15)												70De10			
11542.5(15)												70De10			
11543(5)	1^-											67Na10			
11543.8(15)												70De10			
11544.5(15)												70De10			
11550.2(15)												70De10			
11551.7(15)												70De10			
11555.6(15)												70De10			
11556.5(15)												70De10			
11558.3(15)												70De10			
11563.0(15)												70De10			
11569.3(15)												70De10			
11571.9(15)												70De10			
11572.9(15)												70De10			
11575.4(15)												70De10			
11576.4(15)												70De10			
11589.9(15)												70De10			
11591.3(15)												70De10			
11592.8(15)												70De10			
11594.7(15)												70De10			
11596.9(15)												70De10			
11599.6(15)												70De10			
11601.9(15)												70De10			
11603.7(15)												70De10			
11611(5)												67Na10			
11612.7(15)	1^-											70De10			
11614.1(15)												70De10			
11616.2(15)												70De10			
11621.2(15)												70De10			
11633.0(15)												70De10			
11634.6(15)												70De10			
11636.3(15)												70De10			
11637.6(15)												70De10			
11639.5(15)	1^-											70De10			
11641.3(15)												70De10			
11643.6(15)												70De10			
11644.4(15)												70De10			
11646.4(15)												70De10			
11651.3(15)												70De10			
11653.6(15)												70De10			
11654.4(15)												70De10			
11657.0(15)												70De10			
11660(5)												67Na10			
11662.4(15)												70De10			
11665.1(15)												70De10			

(continued) **$^{42}_{20}$Ca**

E^*	J^π	ℓ_p	L	σ	σ (t,p)	L	S'	L	σ (τ,n)	$T_{1/2}$ orRef.	Branching ratios in percentage			
											E_f^*: 0	1525	1837	2424
[keV]			(t,p)	μb	μb/sr	(d,p)	(τ,d)	(p,d)	μb/sr	Γ_{cm}	J_f^π: 0^+	2^+	0^+	2^+
11671.1(15)											70De10			
11689.4(15)											70De10			
11695.2(15)											70De10			
11697.5(15)											70De10			
11699.9(15)											70De10			
11707.7(15)											70De10			
11709.3(15)											70De10			
11710.3(15)											70De10			
11718.5(15)											70De10			
11727.3(15)											70De10			
11728.4(15)											70De10			
11729.4(15)											70De10			
11733.1(15)											70De10			
11737.5(15)											70De10			
11738.6(15)											70De10			
11743.6(15)											70De10			
11748.2(15)											70De10			
11752.5(15)											70De10			
11756.8(15)											70De10			
11772.9(15)											70De10			
11777.4(15)											70De10			
11778.6(15)											70De10			
11783.1(15)											70De10			
11784.9(15)											70De10			
11786.2(15)											70De10			
11787.6(15)											70De10			
11790.0(15)											70De10			
11795.3(15)											70De10			
11798.4(15)	1^-,2^+										70De10			
11805.6(15)	1^-,2^+										70De10			
11808.4(15)											70De10			
11811.2(15)	1^-,2^+										70De10			
11818.2(15)											70De10			
11822.6(15)											70De10			
11824.1(15)											70De10			
11829.2(15)											70De10			
11830.4(15)											70De10			
11831.9(15)											70De10			
11836.5(15)											70De10			
11843.5(15)											70De10			
11845.0(15)											70De10			
11847.0(15)											70De10			
11852.7(15)											70De10			
11856.5(15)											70De10			
11865.8(15)											70De10			

(continued) **$^{42}_{20}$Ca**

E^*	J^π	ℓ_p	L	σ	σ (t,p)	L	S'	L	σ (τ,n)	$T_{1/2}$ orRef.	Branching ratios in percentage				
											E_f^*:	0	1525	1837	2424
[keV]			(t,p)	μb	μb/sr	(d,p)	(τ,d)	(p,d)	μb/sr	Γ_{cm}	J_f^π:	0^+	2^+	0^+	2^+
11871.7(15)												70De10			
11872.9(15)												70De10			
11873.8(15)												70De10			
11885.3(15)												70De10			
11895.5(15)												70De10			
11902.1(15)												70De10			
11906.4(15)												70De10			
11910.8(15)												70De10			
11923.5(15)												70De10			
11925.7(15)												70De10			
11933.3(15)												70De10			
11942.0(15)												70De10			
11944.6(15)												70De10			
11950.2(15)												70De10			
11959.3(15)												70De10			
11962.9(15)												70De10			
11970.4(15)	1^-											70De10			
11977.0(15)												70De10			
11980.4(15)	1^-											70De10			
11989.2(15)												70De10			
11992.2(15)												70De10			
11997(2)												66Si0A			
12000.3(15)												70De10			
12005.2(15)												70De10			
12006.5(15)												70De10			
12012.1(15)												70De10			
12013.8(15)												70De10			
12020.5(15)												70De10			
12029.6(15)												70De10			
12032.6(15)												70De10			
12040.0(15)												70De10			
12042.0(15)												70De10			
12043.0(15)												70De10			
12051.1(15)												70De10			
12052.2(15)												70De10			
12061.9(15)												70De10			
12066.3(15)												70De10			
12070.2(15)												70De10			
12071.6(15)												70De10			
12078(2)												66Si0A			
12083.0(15)												70De10			
12085.4(15)												70De10			
12092.1(15)												70De10			
12099(2)												66Si0A			
12101.5(15)	1^-											70De10			

(continued) **$^{42}_{20}$Ca**

E^*	J^π	ℓ_p	L	σ	σ (t,p)	L	S'	L	σ (τ,n)	$T_{1/2}$ orRef.	Branching ratios in percentage				
											E_f^*:	0	1525	1837	2424
[keV]			(t,p)	μb	μb/sr	(d,p)	(τ,d)	(p,d)	μb/sr	Γ_{cm}	J_f^π:	0^+	2^+	0^+	2^+
12105.0(15)												70De10			
12109(2)												66Si0A			
12112.4(15)	1^-											70De10			
12116.7(15)												70De10			
12123.9(15)												70De10			
12128.0(15)												70De10			
12135.3(15)												70De10			
12138.1(15)												70De10			
12144.9(15)												70De10			
12146.9(15)												70De10			
12148.7(15)												70De10			
12153.9(15)												70De10			
12158.8(15)	1^-											70De10			
12163.3(15)	1^-											70De10			
12168(3)	$\langle 1^- \rangle$											70De10			
12171(2)												66Si0A			
12175.8(15)	1^-											70De10			
12183.0(15)	1^-											70De10			
12187.9(15)												70De10			
12194(2)												66Si0A			
12203.2(15)												70De10			
12204.3(15)												70De10			
12208.1(15)												70De10			
12210.6(15)												70De10			
12212.4(15)												70De10			
12221.1(15)												70De10			
12222.9(15)												70De10			
12226.4(15)												70De10			
12230.7(15)												70De10			
12238.5(15)												70De10			
12239.6(15)												70De10			
12246.5(15)												70De10			
12248.0(15)												70De10			
12252.0(15)												70De10			
12260.4(15)												70De10			
12265.0(15)												70De10			
12268.0(15)												70De10			
12272.0(15)												70De10			
12277.4(15)												70De10			
12278.8(15)												70De10			
12286.0(15)												70De10			
12288.0(15)												70De10			
12291.4(15)												70De10			
12295.0(15)												70De10			
12298.7(15)												70De10			

(continued) **$^{42}_{20}$Ca**

E^*	J^π	ℓ_p	L	σ	σ (t,p)	L	S'	L	σ (τ,n)	$T_{1/2}$ orRef.	Branching ratios in percentage			
											E_f^*: 0	1525	1837	2424
[keV]			(t,p)	μb	μb/sr	(d,p)	(τ,d)	(p,d)	μb/sr	Γ_{cm}	J_f^π: 0^+	2^+	0^+	2^+
12300.8(15)											70De10			
12305.1(15)											70De10			
12308.0(15)											70De10			
12311.0(15)											70De10			
12320.8(15)											70De10			
12323.3(15)											70De10			
12327.2(15)											70De10			
12331(2)											66Si0A			
12338(2)											66Si0A			
12344(2)											66Si0A			
12355(3)	1^-										68Bu03			
12372(3)											68Bu03			
12375(3)											68Bu03			
12382(3)											68Bu03			
12384(3)											68Bu03			
12389(3)											68Bu03			
12397(3)	3^-										68Bu03			
12405(3)											68Bu03			
12413(3)	0^+										68Bu03			
12432(3)											68Bu03			
12437(3)	1^-										68Bu03			
12449(3)											68Bu03			
12462(3)											68Bu03			
12505(3)											68Bu03			
12517(3)	1^-										68Bu03			
12532(3)											68Bu03			
12544(10)											61Sh09			
12553(3)											68Bu03			
12576(3)											68Bu03			
12583(10)											61Sh09			
12601(3)											68Bu03			
12608(10)											61Sh09			
12623(3)											68Bu03			
12652(3)											68Bu03			
12661(3)											68Bu03			
12669(10)	[1^-]									8500	83Sa15			
12678(10)											61Sh09			
12687(3)											68Bu03			
12696(10)											61Sh09			
12724(10)											61Sh09			
12756(10)	[1^-]										61Sh09			
12823(10)											61Sh09			
12834(10)											61Sh09			
12845(10)											61Sh09			
12853(10)											61Sh09			

(continued) **$^{42}_{20}$Ca**

E^*	J^π	ℓ_p	L	σ	σ (t,p)	L	S'	L	σ (τ,n)	$T_{1/2}$ orRef.	Branching ratios in percentage			
											E_f^*: 0	1525	1837	2424
[keV]			(t,p)	μb	μb/sr	(d,p)	(τ,d)	(p,d)	μb/sr	Γ_{cm}	J_f^π: 0^+	2^+	0^+	2^+
12866(10)											61Sh09			
12880(10)											61Sh09			
12893(10)											61Sh09			
12912(10)											61Sh09			
12921(10)											61Sh09			
12932(10)											61Sh09			
12936(10)											61Sh09			
12943(10)											61Sh09			
12957(10)											61Sh09			
12973(10)											61Sh09			
12994(10)											61Sh09			
13000(10)	[1^-]									10400	61Sh09			
13052(10)											61Sh09			
13095(10)											61Sh09			
13119(10)											61Sh09			
13129(10)											61Sh09			
13138(10)											61Sh09			
13147(10)	[1^-]									11600	61Sh09			
13168(10)											61Sh09			
13195(10)											61Sh09			
13202(10)											61Sh09			
13223(10)											61Sh09			
13267(10)											61Sh09			
13289(10)											61Sh09			
13318(10)											61Sh09			
13344(10)											61Sh09			
13354(10)											61Sh09			
13377(10)											61Sh09			
13396(10)											61Sh09			
13425(10)											61Sh09			
13461(10)											61Sh09			
13498(10)											61Sh09			
13518(10)											61Sh09			
13533(10)											61Sh09			
13468(10)											61Sh09			
13585(10)											61Sh09			
13598(10)											61Sh09			
13610(10)											61Sh09			
14700(50)	0^+								120		01Si10			
				67Wi15			70Fo04		74Pe03					
					67Wi15			73Du02	77Bo16					

Energy levels and branching ratios [95Th06, 90En08, 98En04, 01Si10]. Part 3 **$^{42}_{20}$Ca**

E^*	J^π		Branching ratios in percentage									
		E_f^*:	2752	3189	3254	3392	3447	3654	3885	3954	3999.7	4047
[keV]		J_f^π:	4^+	6^+	4^+	2^+	3^-	2^+	1^-	4^-	$\langle 2^+,3\rangle$	3^-
3189.4(1)*	6^+		100									
3253.9(1)	4^+		35(5)									
3446.9(1)	3^-		5(1)									
3954.4(1)	4^-		15(3)				85(3)					
3999.7(1)	$\langle 2^+,3\rangle$		6(3)									
4047(2)	3^-		15(5)				12(2)					
4099.7(1)	5^-		33(2)	67(2)								
4117(1)	3^-						38(7)					
4354(1)	4^-		55(5)		11(3)		29(5)			5.0(10)		
4418(2)	3^-						35(6)					
4443(2)	4^+		79(4)		8.0(20)							
4448.8(17)	2^+						13(3)	12(2)				
4505(2)	$\langle 2\text{–}4\rangle^+$		30(5)		7(2)	16(3)						
4567(2)	$\langle 1,2^+\rangle$								32(6)			
4715(1)	$\langle 6^+\rangle$		48(3)	7(2)	45(3)							
4896(1)	5^-						14(3)					
4904(2)	3^-		20(5)									
4971(2)	3^-									32(5)		
5017.0(1)	4^+				84(5)							
5075(2)	$\langle 1\text{–}3\rangle^-$						68(7)					
5210(2)	$\langle 2^+\rangle$		12(4)		88(4)							
5214(2)	$\langle 0^+\text{–}4^+\rangle$										61(5)	
5320(2)	$\langle 3,4\rangle^-$				6(2)					38(5)		10(2)
5380(2)	5^-		42(6)	36(5)	22(4)							
5472(2)	$\langle 2\text{–}4\rangle^+$		27(5)		63(6)							
5491.2(2)	6^-			100								
5510(2)	3^-						68(8)					32(8)
5578(2)	$\langle 0^+\text{–}4^+\rangle$					100						
5593(2)	3^-									48(7)		
5601(2)	$\langle 3,4\rangle^-$										67(10)	
5624(2)	3^-										62(9)	
5665(2)	3^-									45(7)		
5670(2)	$\langle 1^-\text{–}4^+\rangle$						56(9)					
5690(2)	$\langle 4^+,5^-\rangle$			14(4)	39(6)							
5716(2)	2^+				100							
5725(2)	$\langle 2^+\text{–}6^+\rangle$		100									
5744.3(2)	7^-			46(3)								
5769(2)	3^-		63(7)									
5775(2)	$\langle 4,5\rangle^+$			11(3)	89(3)							
5806(2)	3^-										100	
5875(2)	2^+		29(9)									
5924(2)	$\langle 3,4\rangle^-$		20(4)							21(4)		
5927(2)	$\langle 4^+\text{–}8^+\rangle$			100								
6003(2)	$3^-,4^-$		100									
6020(2)	$\langle 4^+\text{–}6^-\rangle$			81(6)						19(6)		

(continued) **$^{42}_{20}$Ca**

E^*	J^π		Branching ratios in percentage									
		E_f^*:	2752	3189	3254	3392	3447	3654	3885	3954	3999.7	4047
[keV]		J_f^π:	4^+	6^+	4^+	2^+	3^-	2^+	1^-	4^-	$\langle 2^+,3\rangle$	3^-
6028(2)	$\langle 3\rangle^-$		44(7)							40(7)		
6038(2)	$\langle 1–3\rangle^-$								x			
6113(2)	4^+				86(4)							
6141(2)	6^-									50(5)		
6145.1(2)	7^-			100								
6212(2)	$\langle 3,4\rangle^-$		100									
6248(2)	$\langle 4^+–6^+\rangle$		32(5)	39(6)						29(5)		
6408.9(2)	8^-			12(2)								
6542(2)	5^+			58(6)								
6635(2)	$\langle 4–8\rangle^+$			14(3)								
6675(2)	$\langle 4^+–8^+\rangle$			100								
6700(20)	0^+								x			
6715(2)	$\langle 4^+\rangle$			27(5)								
6817(2)	$\langle 4,5\rangle^+$			100								
6896(2)	4^+			71(4)								
6975(2)	$\langle 5^+\rangle$			45(5)								
7130(2)	4^+			100								
7198(2)				100								
7389(2)	4^+			100								
7420(2)				75(4)								
7542(2)	$\langle 4^+–7^-\rangle$			24(7)								
7634(2)	$\langle 4^+\rangle$			28(4)								
7697(2)	$\langle 4^+\rangle$			100								
7920(2)	$\langle 4^+–8^+\rangle$			38(8)								
7940(2)	$\langle 4^+–7^-\rangle$			57(7)								
8365(2)	$\langle 6^-–8^+\rangle$			43(10)								
8774(2)	$\langle 4^+,5^-\rangle$			29(8)								

Energy levels and branching ratios [95Th06, 90En08, 98En04, 01Si10]. Part 4 **$^{42}_{20}$Ca**

E^*	J^π		Branching ratios in percentage										
		E_f^*:	4099.7	4117	4354	4418	4505	4715	4896	4971	5210	5491	5491.2
[keV]		J_f^π:	5^-	3^-	4^-	3^-		$\langle 6^+\rangle$	5^-	3^-	$\langle 2^+\rangle$	3^-	6^-
4896(1)	5^-		80(3)	6.0(10)									
5075(2)	$\langle 1–3\rangle^-$					32(7)							
5188(2)	$\langle 2–4\rangle^+$					100							
5320(2)	$\langle 3,4\rangle^-$		23(4)			23(4)							
5439(2)	$\langle 3,4\rangle^-$		100										
5491(2)	3^-			69(9)									
5601(2)	$\langle 3,4\rangle^-$						33(10)						
5665(2)	3^-					23(5)							
5690(2)	$\langle 4^+,5^-\rangle$							47(6)					

(continued) **$^{42}_{20}$Ca**

E^*	J^π	Branching ratios in percentage										
	E_f^*:	4099.7	4117	4354	4418	4505	4715	4896	4971	5210	5491	5491.2
[keV]	J_f^π:	5^-	3^-	4^-	3^-		$\langle 6^+ \rangle$	5^-	3^-	$\langle 2^+ \rangle$	3^-	6^-
5744.3(2)	7^-	54(3)										
5924(2)	$\langle 3,4 \rangle^-$	37(5)		12(3)		10(3)						
5994(2)	3^-								17(5)			
6093(2)	$\langle 1–3 \rangle^-$	32(5)						68(5)				
6113(2)	4^+				14(4)							
6141(2)	6^-	16(5)		26(6)							8(3)	
6408.9(2)	8^-											72(2)
6542(2)	5^+	17(4)									25(4)	
6585(2)											46(6)	
6635(2)	$\langle 4–8 \rangle^+$						86(3)					
6715(2)	$\langle 4^+ \rangle$						33(5)			40(5)		
6746(2)	$\langle 3 \rangle^+$	49(9)						51(9)				
6896(2)	4^+										6(2)	
6940(2)	$\langle 5^–7^- \rangle$	34(5)						46(6)				
6975(2)	$\langle 5^+ \rangle$	27(4)					12(3)				16(3)	
7420(2)							25(4)					
7542(2)	$\langle 4^+–7^- \rangle$						38(7)	38(7)				
7560(2)							100					
7634(2)	$\langle 4^+ \rangle$						35(5)					
7724(2)							100					
7758(2)	$\langle 6^- \rangle$							26(4)			32(4)	
7920(2)	$\langle 4^+–8^+ \rangle$						62(8)					
8050(2)							100					
8102(2)							67(5)					
8450(2)	$\langle 7,8 \rangle^-$										42(5)	
8774(2)	$\langle 4^+,5^- \rangle$											71(8)

Energy levels and branching ratios [95Th06, 90En08, 98En04, 01Si10]. Part 5 **$^{42}_{20}$Ca**

E^*	J^π	Branching ratios in percentage										
	E_f^*:	5690	5744.3	5927	6145.1	6408.9	6554.0	6635	6715	7282	7368.6	7750.8
[keV]	J_f^π:	$\langle 4^+,5^- \rangle$	7^-	$\langle 4^+–8^+ \rangle$	7^-	8^-	9^-		$\langle 4^+ \rangle$		10^-	$\langle 11 \rangle^-$
6408.9(2)	8^-				15.9(10)							
6554.0(2)	9^-		87.0(20)			13.0(20)						
6585(2)			54(6)									
6896(2)	4^+			23(4)								
6940(2)	$\langle 5^–7^- \rangle$		20(4)									
7282(2)						74(4)	26(4)					
7345(2)						100						
7361(2)					100							
7368.6(2)	10^-						100					
7415(2)								100				

(continued) **$^{42}_{20}$Ca**

E^*	J^π		Branching ratios in percentage										
		E_f^*:	5690	5744.3	5927	6145.1	6408.9	6554.0	6635	6715	7282	7368.6	7750.8
[keV]		J_f^π:	$\langle 4^+,5^-\rangle$	7^-	$\langle 4^+–8^+\rangle$	7^-	8^-	9^-		$\langle 4^+\rangle$		10^-	$\langle 11\rangle^-$
7634(2)	$\langle 4^+\rangle$		19(3)		18(3)								
7750.8(3)	$\langle 11\rangle^-$											100	
7758(2)	$\langle 6^-\rangle$			24(4)			18(3)						
7801(2)	$\langle 5^–9^-\rangle$					100							
7838(2)										100			
7940(2)	$\langle 4^+–7^-\rangle$		43(7)										
8060(2)	$\langle 6^–9^-\rangle$			6.0(21)			94.0(21)						
8083(2)	$7^–11^-$							100					
8102(2)			33(5)										
8297.5(3)	$\langle 11\rangle^-$							44(6)				56(6)	
8365(2)	$\langle 6^–8^+\rangle$						57(10)						
8450(2)	$\langle 7,8\rangle^-$						29(5)	29(5)					
8512(2)	$\langle 6^–9^-\rangle$			53(7)			47(7)						
8517(2)					100								
8522.4(3)	$8^–12^-$												100
8580(2)										x			
8611(2)										x			
8745(2)	$8^–12^-$											x	
8847(2)									100				
8950(2)									100				
9037(2)	$8^–12^-$											100	
9206(2)	$\langle 5^–9^-\rangle$					52(7)					48(7)		
9378(2)	$\langle 5^–9^-\rangle$			100									
9760(2)	$7^–11^-$							100					
9842(2)	$\langle 5,6\rangle^-$					100							

Energy levels and branching ratios [90En08, 98En04, 01Ca24]. **$^{43}_{20}$Ca**

E^*	$2J^\pi$	$2T$	L	σ (d,p)	S'	S'	σ (α,τ)	S'	S_n^+	L	C^2S	C^2S	S_n^-	$T_{1/2}$ or	Ref.
[keV]				μb/sr	(d,p)	(α,τ)	μb/sr	(d,p)	eval		(p,d)	(d,t)	eval	Γ_{cm}	
0	7^-		3	2850	4.5	5.4	7000	5.5	0.58(6)	3	2.8	3.20	3.1(3)	Stable	77En02
372.76(1)	5^-		3	60	3.9	0.15	105		<0.1	3	0.05	0.15	0.17(8)	33(3) ps	77En02
593.39(1)	3^-		1	1360	0.16	0.17	11	0.3**	0.04(2)	1	0.04	0.07	0.10(3)	81(3) ps	77En02
990.26(1)	3^+		2	290	0.28	0.87	180	0.52	0.11(2)	2	2.4	2.10	2.2(4)	48(4) ps	77En02
1394.47(1)	5^+		$\langle 2\rangle$	30	0.03	0.06	13	0.12		2	0.34	0.11		2.2(5) ps	69Yn01
1677.8(2)	11^-			30			14							0.9(2) ps	
1902.1(2)	7^+			50										0.53(10) ps	
1931.5(2)	5^-			20										116(22) fs	
1957.4(3)	1^+		0	2790	0.10		23	0.13	0.05(2)	0	1.0	0.75	1.0(2)	1.1(3) ps	77En02
2046.2(1)	3^-		1	28200	2.9	4.26	93	2.7**	0.72(9)	1	0.05	0.11	0.19(4)	0.8(2) ps	77En02
2067.2(2)	7^-													21(7) fs	

(continued) **$^{43}_{20}$Ca**

E^* [keV]	$2J^\pi$	$2T$	L	σ (d,p) μb/sr	S' (d,p)	S' (α,τ)	σ (α,τ) μb/sr	S' (d,p)	S_n^+ eval	L	C^2S (p,d)	C^2S (d,t)	S_n^- eval	$T_{1/2}$ or Γ_{cm}	Ref.
2093.9(2)	9^-		1	40	0.04			0.06						1.4(4) ps	66Do02
2102.8(3)	3^-													0.33(9) ps	
2224.0(3)	3^-,5^-			20										28(17) fs	66Do02
2249.0(2)	9^-			60			23							37(8) fs	66Do02
2272.6(3)	3^+,5^+		⟨2⟩	60	0.01					2	0.26	0.15		0.28(8) ps	68Sm05
2409.7(2)	9^+													1.2(3) ps	
2523(10)			⟨1⟩	110	0.01										
2611.1(3)	1^-		1	2900	0.28	0.33	7	0.3**						123(45) fs	66Do02
2673.7(3)	5^-,7^-		3	60	0.08	0.3,0.2	68	0.14						36(13) fs	66Do02
2696.5(5)	3^+,5^+		2	110	0.02					2	0.26	0.14		<38 fs	
2753(5)	1^+		0	150	0.002		8	0.01							66Do02
2754.1(2)	15^-													24.1(14) ps	
2769.6(5)	1–5													100(30) fs	
2844.8(5)	$\langle 5\rangle^+$		0	110	0.001	0.3,0.3	19			2	0.34	0.23		0.55(15) ps	
2878.4(6)	1^-		1	2050	0.18			0.2**						107(38) fs	66Do02
2943.5(3)	3^-		1	2100	0.19	0.74		0.2**						<62 fs	66Do02
2951.3(2)	11^+						16							4.7(12) ps	82Ho17
3028.7(8)	$\langle 5,9^-\rangle$			20										<62 fs	66Do02
3030(1)															
3049.6(15)				30										<62 fs	66Do02
3050.7(4)	11^-						23							<17 fs	82Ho17
3076.0(15)	$\langle 5\rangle^+$		0	300	0.003	0.7,0.5	31			2+0	0.5,0.1	0.56		<17 fs	72Ma23
3096.0(7)				100										<17 fs	
3097.1(6)	$\langle 5$–$11\rangle^+$													0.76(21) ps	
3195.7(5)	$\langle 7,9\rangle^+$		4			0.10	67							118(42) fs	82Ho17
3278(10)	$\langle 5,7\rangle^+$						80			⟨2⟩		0.25			76Do05
3285.7(5)	3^-		1	1340	0.12			0.1**						<62 fs	66Do02
3315.2(6)	1^-,3^-		1	370	0.03			0.05						132(60) fs	66Do02
3371.3(2)	13^+						18							<14 ps	82Ho17
3376.6(10)				20											
3419(6)	5^-,7^-		3	160	0.19	0.4,0.3	65								
3469(5)															
3505.4(3)	13^+						25							73(24) fs	82Ho17
3572.2(5)	3^-		1	2300	0.19			0.2**							66Do02
3604(10)	$\langle 1\rangle^+$		0	60	0.001			0.01		2	0.05				66Do02
3662.6(4)	13^-		⟨2⟩	50	0.01		19							49(21) fs	
3705(10)				20											
3737(10)				40											
3772(10)	1^-,3^-		1	110	0.01										
3783(10)															
3816.2(8)	$\langle 7^-\rangle$		⟨3⟩	80	0.16	0.20	30	0.16						69(38) fs	66Do02
3837(7)	$\langle 3$–$13\rangle^+$														
3864(10)			⟨1⟩	350	0.05			0.05							66Do02
3898(10)				20											
3918(8)	X^+		[4]	480	0.04		62	1.19							66Do02

(continued) **$^{43}_{20}$Ca**

E^* [keV]	$2J^\pi$	$2T$	L	σ (d,p) μb/sr	S' (d,p)	S' (α,τ)	σ (α,τ) μb/sr	S' (d,p)	S_n^+ eval	L	C^2S (p,d)	C^2S (d,t)	S_n^- eval	$T_{1/2}$ or Γ_{cm}	Ref.
3943.9(3)	15^+													0.76(21) ps	
3958(10)				70											
3978(10)	3^+,5^+		2	100	0.01					2	0.26	0.21			76Do05
4017(10)				90											
4048(10)	3^+,5^+		2	100	0.01		29								
4078(10)															
4089(10)			$\langle 3 \rangle$	70	0.08										
4136.0(7)	7^+,9^+		4	60	0.19	0.04	17							<260 fs	
4148(10)	1^+		0	280	0.003										
4174.7(10)															
4186.6(4)	15^+													125(50) fs	
4207.2(5)	1^-		1	10300	0.86	0.44	4	0.85**							66Do02
4210(20)	3^+,5^+									2		0.2			76Do05
4239(10)	1^-,3^-		1	1410	0.10			0.12							66Do02
4268(10)			1	260	0.04			0.04							66Do02
4291(10)	7^+–13^+														
4298(10)	1^+		0	320	0.003			0.01							66Do02
4364(7)	7^+–13^+														
4394.9(5)	15^-													42(17) fs	
4401(10)				300											
4461(7)	5^-,7^-		3	180	0.36	1.45	94	0.36							66Do02
4498(10)				150											
4533(10)	1^+		0	210	0.002										
4585(10)															
4591.1(4)	17^+													0.21(5) ps	
4603.4(10)	1^+–5^+														
4621.3(4)	15^+													76(28) fs	
4641.6(10)	3^+,5^+		2	410	0.06										
4654(10)	1^+		0	210	0.002										
4703(7)				140											
4736(10)	3^+,5^+									2		0.19			76Do05
4758(10)															
4783(10)															
4796(10)															
4826(10)						0.90	37								82Ho17
4854(10)															
4874(10)	$\langle 7$–$17 \rangle^+$						22								82Ho17
4901.2(4)	1^-,3^-		1	2250	0.14										
4922(10)															
4944(10)															
4982(10)			2	520	0.07										66Do02
5004(8)				190		1.16	52								66Do02
5037.6(3)	1^-,3^-		1	2590	0.16		18								66Do02
5047(10)	1^-,3^-		1	870	0.06										
5072(10)	1^-,3^-		1	690	0.04										

(continued) **$^{43}_{20}$Ca**

E^* [keV]	$2J^\pi$	$2T$	L	σ (d,p) μb/sr	S' (d,p)	S' (α,τ)	σ (α,τ) μb/sr	S' (d,p)	S_n^+ eval	L	C^2S (p,d)	C^2S (d,t)	S_n^- eval	$T_{1/2}$ or Γ_{cm}	Ref.
5100(10)	1^+		0	270	0.003										
5155.5(5)	13^-,17^-													76(28) fs	
5170(10)	3^+,5^+		2	290	0.04										
5189(10)	7^+–13^+														
5193(10)	1^+		0	580	0.006										
5215(10)	1^+		0	1460	0.015		120								66Do02
5246(10)	7^+–13^+						18								82Ho17
5351(10)	7^+–13^+														
5394.8(10)							6							0.104(31) ps	82Ho17
5555.5(6)	15^+,19^+						35							1.35(38) ps	82Ho17
5696(10)	$\langle 7$–$13\rangle^+$						12								82Ho17
5728(8)	3^+,5^+						25			2		0.18			76Do05
5805							22								82Ho17
5931.6(8)	11^-–19^-						27							55(17) fs	82Ho17
5991(8)			$\langle 3\rangle$				49								82Ho17
6015(20)	1^+									0	0.05	0.2			76Do05
6087(10)															
6177(10)										$\langle 2\rangle$		0.24			76Do05
6223.7(8)	17^+,21^+													0.58(15) ps	
6300															
6410															
6460															
6570															
6640															
6680															
6790															
6950															
7040															
7090															
7190															
7500															
7580(20)															
7730															
7932.7(3)	1^+														
7990(15)*	$\langle 3\rangle^+$	$\langle 5\rangle$								2	0.31	1.0			90En08
8160															
8270															
8470															
8590(17)*	1^+	$\langle 5\rangle$								0	0.15	0.25			90En08
8767(17)*	5^-,7^-	$\langle 5\rangle$								3	0.07	0.35			90En08
8933(17)*	1^-,3^-	$\langle 5\rangle$								1	0.006	0.14			90En08
9145(20)*	3^+,5^+	$\langle 5\rangle$								2	0.05	0.2			90En08
10485(20)*	1^+	$\langle 5\rangle$								0	0.03	0.12			90En08
10720(30)*	3^+,5^+									2		0.2			76Do05
11380(30)*															

(continued) **$^{43}_{20}$Ca**

E^*	$2J^\pi$	$2T$	L	σ (d,p)	S'	S'	σ (α,τ)	S'	S_n^+	L	C^2S	C^2S	S_n^-	Ref.
[keV]				μb/sr	(d,p)	(α,τ)	μb/sr	(d,p)	eval		(p,d)	(d,t)	eval	
12060(30)*														
12265(30)*	3^+,5^+									2		0.2		76Do05
13230(30)*										$\langle 2\rangle$		0.2		76Do05
13700(30)														
14070(120)														
					74Br19	82Ho17	82Ho17	66Do02	77En02		72Ma23	76Do05	77En02	Ref.
				74Br19										Ref.

Additional data on this isotope can be found in [96Be39, 89Ra06, 85Ha08, 77Sc05, 74De42, 65Be11].
Abundance: 0.135(10) %.
* Possible IAS (Isobar-Analog States) corresponding to the levels in ^{43}K with E^*=0.0, 561, 738, 975, 1110, 2451, 2670, 3393, 4022, 4270 and 5240 keV [72Ma23].
** These values $(2J+1)S$ for 8 states with ℓ_n=1 were evaluated in [87Ka28] for estimation of direct neutron capture cross section.
Two sets of values S' from the the (d,p) reaction are from [74Br19] and [66Do02].
S_n^+ and S_n^- are the evaluated values of neutron transfer and pickup spectroscopic factors [77En02].
Cross sections of the (α,τ) reaction were measured at 9° [82Ho17].
Two sets of values S' from the (d,p) reaction are from [74Br19] and [66Do02]; Data for this isotope are considered in vol. LB I/18A.

Energy levels and branching ratios [90En08, 98En04, 01Ca24]. Part 2 **$^{43}_{20}$Ca**

E^*	$2J^\pi$		Branching ratios in percentage								
		E_f^*:	0	373	593	990	1394	1678	1902	1957	2046
[keV]		$2J_f^\pi$:	7^-	5^-	3^-	3^+	5^+	11^-	7^+	1^+	3^-
372.76(1)	5^-		100								
593.39(1)	3^-		70.3(3)	29.7(6)							
990.26(1)	3^+		0.31(4)	86.7(1)	12.9(1)						
1394.47(1)	5^+		5.0(3)	75.2(7)	5.6(5)	14(1)					
1677.8(2)	11^-		100								
1902.1(2)	7^+		70(4)			13(4)	17(2)				
1931.5(2)	5^-		59(1)	35(1)	6.9(6)						
1957.4(3)	1^+				78(1)	22(1)					
2046.2(1)	3^-		63(4)	20(2)	8(1)	7(1)	1(1)				
2067.2(2)	7^-		78.1(9)	21.9(9)							
2093.9(2)	9^-		100								
2102.8(3)	3^-		25(15)	50(20)	25(15)						
2224.0(3)	3^-,5^-			42.7(13)	57.3(13)						
2249.0(2)	9^-		87.0(10)	11.0(10)				2.0(5)			
2272.6(3)	3^+,5^+					84(3)	16(3)				
2409.7(2)	9^+		45(4)				44(4)		11(2)		
2611.1(3)	1^-				65(10)						35(10)

(continued) **$^{43}_{20}$Ca**

E^*	$2J^\pi$		Branching ratios in percentage								
		E_f^*:	0	373	593	990	1394	1678	1902	1957	2046
[keV]		$2J_f^\pi$:	7^-	5^-	3^-	3^+	5^+	11^-	7^+	1^+	3^-
2673.7(3)	5^-,7^-		x	100			x				
2696.5(5)	3^+,5^+			54.1(8)	15(8)	31.2(8)					
2754.1(2)	15^-							100			
2769.6(5)	1–5				x	x					
2844.8(5)	$\langle 5\rangle^+$		x				x		x		
2878.4(6)	1^-			x	x					x	x
2943.5(3)	3^-		8(4)	x	63(8)	22(8)					
2951.3(2)	11^+								21.0(10)		
3028.7(8)	$\langle 5,9^-\rangle$			100							
3030(1)					69	31(9)					
3049.6(15)			100								
3050.7(4)	11^-		36(2)					52(2)			
3076.0(15)	$\langle 5\rangle^+$		100								
3096.0(7)				x	x						
3097.1(6)	$\langle 5$–$11\rangle^+$								x		
3195.7(5)	$\langle 7,9\rangle^+$								x		
3278(10)	$\langle 5,7\rangle^+$		34			49	17				
3285.7(5)	3^-			25(10)	25(10)						50(15)
3315.2(6)	1^-,3^-										100
3371.3(2)	13^+							12(1)			
3505.4(3)	13^+							75(2)			
3572.2(5)	3^-			14(9)	55(14)						32(9)
3662.6(4)	13^-							61(2)			
4207.2(5)	1^-				69(16)						31(16)
4394.9(5)	15^-							41(3)			
4603.4(10)	1^+–5^+				x						
4641.6(10)	3^+,5^+										x
4901.2(4)	1^-,3^-				20(15)						30(15)
5037.6(3)	1^-,3^-					40(15)				30(10)	30(10)

Energy levels and branching ratios [90En08, 98En04, 01Ca24]. Part 3 **$^{43}_{20}$Ca**

E^*	$2J^\pi$		Branching ratios in percentage								
		E_f^*:	2094	2103	2249	2273	2410	2754	2844.8	2951.3	3050.7
[keV]		$2J_f^\pi$:	9^-	3^-	9^-	3^+,5^+	9^+	15^-	$\langle 5\rangle^+$	11^+	11^-
2943.5(3)	3^-			8(5)							
2951.3(2)	11^+		65.0(10)				14.0(10)				
3050.7(4)	11^-				12(1)						
3097.1(6)	$\langle 5$–$11\rangle^+$						x				
3195.7(5)	$\langle 7,9\rangle^+$								x		
3371.3(2)	13^+						41(1)	26(1)		21(1)	
3376.6(10)			x								

(continued) **$^{43}_{20}$Ca**

E^*	$2J^\pi$	Branching ratios in percentage								
	E^*_f:	2094	2103	2249	2273	2410	2754	2844.8	2951.3	3050.7
[keV]	$2J^\pi_f$:	9^-	3^-	9^-	3^+,5^+	9^+	15^-	$\langle 5\rangle^+$	11^+	11^-
3505.4(3)	13^+						13(2)		12(2)	
3662.6(4)	13^-			14(2)			13(2)			12(2)
3816.2(8)	$\langle 7^-\rangle$					100				
3943.9(3)	15^+						15(7)			
4136.0(7)	7^+,9^+								100	
4174.7(10)					100					
4394.9(5)	15^-						37(3)			
4591.1(4)	17^+						27(5)			
4901.2(4)	1^-,3^-		30(20)		20(10)					
5394.8(10)							100			

Energy levels and branching ratios [90En08, 98En04, 01Ca24]. Part 4 **$^{43}_{20}$Ca**

E^*	$2J^\pi$	Branching ratios in percentage								
	E^*_f:	3371.3	3505.4	3662.6	3943.9	4186.6	4394.9	4591.1	5155.5	5555.5
[keV]	$2J^\pi_f$:	13^+	13^+	13^-	15^+	15^+	15^-	17^+	13^-,17^-	
3943.9(3)	15^+	51(7)	34(7)							
4186.6(4)	15^+	86(3)	14(3)							
4394.9(5)	15^-			22(3)						
4591.1(4)	17^+				49(5)	24(5)				
4621.3(4)	15^+	72(4)			28(4)					
5155.5(5)	13^-,17^-			35(3)			65(3)			
5555.5(6)	15^+,19^+				60			40		
5931.6(8)	11^-–19^-								100	
6223.7(8)	17^+,21^+									100

Energy levels and branching ratios [90En08, 98En04, 99Ca45]. **$^{44}_{20}$Ca**

E^*	J^π	T	L	S^+_n	L	S^-_p	I_α	L	I_d	L	β_L	I_p	C^2S	$T_{1/2}$ or	Ref.
[keV]				eval		eval	(t,α)		(^{6}Li,d)		(p,p′)	(t,p)	(d,τ)	Γ_{cm}	
0.0	0^+		3	3.1(3)		0.5(1)	100	0	100			100(5)	0.40	Stable	76Be27
1157.03(2)	2^+		1	0.08(2)			41	2		2	0.24	13(1)	0.15	2.6(1) ps	72Lo10
			3	0.4(1)		0.18(3)									78En02
1883.52(2)	0^+		3	0.4(1)		0.12(3)	19	0	17			1.2(2)	0.11	14(4) ps	78Fo32
2283.12(2)	4^+		1	0.01(1)				4		4	0.11	1.6(2)	0.07	1.9(7) ps	72Lo10
			3	0.14(4)		0.09(3)	9								78En02
2656.51(2)	2^+		1	<0.02						2	0.06	2.6(1)	0.16	30(3) fs	72Lo10
			3	0.5(1)		0.19(3)	51	2							78En02

(continued) **$^{44}_{20}$Ca**

E^* [keV]	J^π	T	L	S_n^+ eval	L	S_p^- eval	I_α (t,α)	L	I_d (^{6}Li,d)	L	β_L (p,p′)	I_p (t,p)	C^2S (d,τ)	$T_{1/2}$ or Γ_{cm}	Ref.
3044.26(3)	4^+		3	0.9(2)		<0.04	8					4.9(2)		4.6(11) ps	78En02
3285.0(1)	6^+													13(1) ps	
3301.28(5)	2^+		3	2.45*								4.0(2)		35(18) fs	67Bj02
3307.87(2)	3^-				2	0.76*	108			3	0.23	incl		<0.35 ns	72Lo10
3357.3(1)	$\langle 2^+–4^+\rangle$				3	0.12*	44					0.8(1)	0.92	<28 fs	69Ha15
3580.6(6)									<1.5			1.3(2)			76Be27
3661.53(1)	1						≈12					1.1(2)			67Bj06
3676.10(2)	$\langle 1^–3^-\rangle$									$\langle 2\rangle$	0.065	incl			72Lo10
3712.0(2)	$\langle 3–5\rangle^-$				2	1.1*	170							<0.42 ns	69Ha15
3776.3(1)	2												1.70	<0.69 ns	69Ma26
3865(10)															
3913.7(1)	5^-				2	0.92*	142			5	0.12			>2 ps	72Lo10
3922.6(1)	$\langle 3^+–5\rangle$		$\langle 1\rangle$	0.04*										<0.56 ns	67Bj02
4011.5(5)							5								69Ha15
4092.0(2)	$\langle 2^+–4^+\rangle$														
4094.0(6)	$\langle 2^+–4^+\rangle$		3	0.09*	3	0.16*	61								67Bj02
4169(4)															
4195.7(4)	2^+		1	0.02*										<0.69 ns	67Bj02
4260.3(4)	$\langle 2^+,3\rangle$														
4315.2(2)	$\langle 1,2,3\rangle$						≈4								69Ha15
4358.44(3)	3^-				0	0.63*	151								69Ha15
4399.2(6)	3^-									3	0.14				72Lo10
4409.17(2)	$\langle 1–3\rangle^-$		0	0.01*											67Bj02
4436.7(5)	$\langle 1,2^+\rangle$														
4480.0(6)	2^+		$\langle 1\rangle$	0.04*			17					5.7(3)	0.55		67Bj02
4552.65(3)	$\langle 1–3\rangle^-$														
4564.8(2)	5^-				2	0.16*	26					2.0(1)			69Ha15
4572.6(5)	$\langle 1,2,3\rangle$						incl								
4584.0(2)	$\langle 2^+–4^+\rangle$									2	0.09			<3.5 ns	72Lo10
4604(10)															
4651.0(5)	2^+		1	0.28*			15					26(1)			67Bj02
4690.2(6)	$\langle 1^–4^+\rangle$														
4804.2(6)	$\langle 1^-,2^+\rangle$														
4824.4(6)	$\langle 1–3\rangle$														
4866.10(10)	$\langle 1,2^+\rangle$														
4884.02(8)	$\langle 1–3\rangle^-$														
4904.6(4)	3^-				2	0.13*	22								69Ha15
4982(8)	$\langle 2–5\rangle^+$		1	0.05*			52								67Bj02
5005.7(2)	4^+		1	0.25*											67Bj02
5025.7(2)	3^-				0	0.16*	48								69Ha15
5087.6(10)	$\langle 8^+\rangle$													0.5(1) ps	
5096.8(5)	$\langle 3,4\rangle^-$				0	0.33	99						0.46		69Ha15
5130.2(2)	$\langle 2,3\rangle^+$		1	0.12*			incl								67Bj02
5162.5(5)	$\langle 1,2^+\rangle$														
5201.1(4)	$\langle 1–3\rangle^-$														

(continued) **$^{44}_{20}$Ca**

E^* [keV]	J^π	T	L	S_n^+ eval	L	S_p^- eval	I_α (t,α)	L	I_d (^{6}Li,d)	L	β_L (p,p′)	I_p (t,p)	C^2S (d,τ)	$T_{1/2}$ or Γ_{cm}	Ref.
5210.0(10)	1^+													2.0(3) fs	
5222(4)					2	0.16						13(1)			67Bj06
5230.3(3)	$\langle 2–5\rangle^+$		1	0.54*			29					incl		<4.2 ns	67Bj02
5289.2(4)	$\langle 2–5\rangle^+$		1	0.27*											67Bj02
5300.7(5)															
5324.9(7)															
5342.8(8)	2^+		1	0.28*								5.1(3)			67Bj02
5367(1)															
5375.1(8)	$\langle 2–5\rangle^+$		1	0.07*								3.6(2)			67Bj02
5404(4)	$\langle 3,4\rangle^-$				0	0.41*	131						0.50		69Ha15
5459.2(5)	$\langle 2–4\rangle^+$		1	0.33*											67Bj02
5519(5)							26								69Ha15
5548.7(3)	$\langle 2–4\rangle^+$		1	0.40*											67Bj02
5561.0(5)	3^-				0	0.14*	49								69Ha15
5655(4)	$\langle 1–6\rangle^-$				2	0.10*	19					3.5(2)			69Ha15
5733.2(3)	$\langle 2–5\rangle^+$		1	0.75			30					3.0(2)		<3.5 ns	67Bj02
5775.7(3)	$\langle 2^+–4^+\rangle$														
5800(12)							$\langle 11\rangle$								69Ha15
5822(10)															
5864(20)	0^+							0	89			81(4)			76Be27
5866.6(5)	$\langle 2^+–5\rangle$		$\langle 1\rangle$	0.16*											67Bj02
5881(12)					$\langle 2\rangle$	0.44*	$\langle 51\rangle$								69Ha15
5965(10)															
6014(20)												8.5(4)	0.92		67Bj06
6040.2(7)	$\langle 2–5\rangle^+$		1	0.08*											67Bj02
6145.7(4)	$\langle 2–5\rangle^+$		1	0.46*											67Bj02
6211.3(6)															
6438(20)															
6578(20)															
6672.7(5)															
6744(20)															
6778(20)															
6913(20)															
6996(20)												15(1)			67Bj06
7044(20)															
7844(20)															
8050															
8290															
8860															
9460															
9750															
11850(10)	2^-	3													

(continued) **$^{44}_{20}$Ca**

E^*	J^π	T	L	S_n^+	L	S_p^-	I_α	L	I_d	L	β_L	I_p	C^2S	$T_{1/2}$ or	Ref.
[keV]				eval		eval	(t,α)		(^{6}Li,d)		(p,p$'$)	(t,p)	(d,τ)	Γ_{cm}	
				77En02		69Ha15	69Ha15		76Be27			67Bj06	69Ma26		Ref.
				67Bj02		77En02			71Fo13						Ref.

Additional data on this isotope can be found in [03Ta05, 03Sc21, 01La33, 90Fi07, 79Pe08, 77Cl01, 74De42, 72Lo10, 71Fo13, 69Ha15, 68Ha31, 68Pe10].
Abundance: 2.09(11) %.
* $(2J_f+1)S/8$ from [67Bj02] instead of S_n^+ [78En02] and S from [69Ha15] instead of S_p^- [78En02].
For two low-lying states (J^π=7/2$^-$, 3/2$^+$) parameter C^2S from neutron pickup reactions (p,d) and (d,t) was found to be close to the theoretically expected values 6.0 and 3.4 [71Ra35].
For 12 low-lying states (n,n) configuration was found by the study of the (α,^{2}He) reaction [90Fi07].
Data for this isotope are considered in vol. LB I/18A.

Energy levels and branching ratios [90En08, 98En04, 99Ca45]. Part 2 **$^{44}_{20}$Ca**

E^*	J^π	L	S_N	Ref.	Branching ratios in percentage							
					E_f^*:	0.0	1157	1883	2283	2656	3044	3285
[keV]		(d,^{6}Li)	(d,^{6}Li)		J_f^π:	0$^+$	2$^+$	0$^+$	4$^+$	2$^+$	4$^+$	6$^+$
0.0	0$^+$	0	1.0	76Be27								
1157.03(2)	2$^+$	2	0.15	72Lo10		100						
				78En02								
1883.52(2)	0$^+$	0	0.13	78Fo32		x	100					
2283.12(2)	4$^+$			72Lo10			100					
				78En02								
2656.51(2)	2$^+$			72Lo10		11.1(5)	89(4)					
				78En02								
3044.26(3)	4$^+$			78En02			46(3)		54(3)			
3285.0(1)	6$^+$								100			
3301.28(5)	2$^+$			67Bj02		30(5)	70(4)					
3307.87(2)	3$^-$			72Lo10		0.06(2)	70(1)		20.5(3)	9.3(3)	0.34(9)	
3357.3(1)	$\langle$2$^+$–4$^+\rangle$			69Ha15			12		88			
3580.6(6)		0	0.55	76Be27			100					
3661.53(1)	1			67Bj06		68.4(13)	7.3(6)	23.8(5)		0.33		
3676.10(2)	$\langle$1$^-$–3$^-\rangle$			72Lo10		0.11(5)	75(1)			6.5(3)		
3712.0(2)	$\langle$3–5$\rangle^-$			69Ha15					26(13)			
3776.3(1)	2			69Ma26			93(18)			7(5)		
3865(10)												
3913.7(1)	5$^-$			72Lo10							<70	100
3922.6(1)	$\langle$3$^+$–5$\rangle$			67Bj02					<24		48	52
4011.5(5)				69Ha15								
4092.0(2)	$\langle$2$^+$–4$^+\rangle$								32			68
4094.0(6)	$\langle$2$^+$–4$^+\rangle$			67Bj02			40(15)		60(40)			
4169(4)												

(continued) **$^{44}_{20}$Ca**

E^*	J^π	L	S_N	Ref.		Branching ratios in percentage					
					E_f^*:	0.0	1157	1883	2283	2656	3044	3285
[keV]		(d,^{6}Li)	(d,^{6}Li)		J_f^π:	0^+	2^+	0^+	4^+	2^+	4^+	6^+
4195.7(4)	2^+			67Bj02		x	100					
4260.3(4)	$\langle 2^+,3\rangle$						55(20)		45(35)			
4315.2(2)	$\langle 1,2,3\rangle$			69Ha15			41(6)			59(14)		
4358.44(3)	3^-			69Ha15			46(3)			6(3)		
4399.2(6)	3^-			72Lo10			100					
4409.17(2)	$\langle 1–3\rangle^-$			67Bj02		0.74(12)	2.2(3)			56.5(8)		
4436.7(5)	$\langle 1,2^+\rangle$					[100]						
4480.0(6)	2^+			67Bj02			100					
4552.65(3)	$\langle 1–3\rangle^-$						37(1)		0.7(5)	2.5(18)		
4564.8(2)	5^-			69Ha15		16			16			
4572.6(5)	$\langle 1,2,3\rangle$						30(12)			70(36)		
4584.0(2)	$\langle 2^+–4^+\rangle$			72Lo10			53		21		21	
4604(10)												
4651.0(5)	2^+			67Bj02		11(6)				89(60)		
4690.2(6)	$\langle 1^-–4^+\rangle$						100					
4804.2(6)	$\langle 1^-,2^+\rangle$						100					
4824.4(6)	$\langle 1–3\rangle$									100		
4866.10(10)	$\langle 1,2^+\rangle$					56(2)	≤16	44(6)				
4884.02(8)	$\langle 1–3\rangle^-$						4.2(8)					
4904.6(4)	3^-			69Ha15			61			39		
4982(8)	$\langle 2–5\rangle^+$			67Bj02								
5005.7(2)	4^+			67Bj02			6		53			
5025.7(2)	3^-			69Ha15		2.2(22)	83(22)					
5087.6(10)	$\langle 8^+\rangle$											100
5096.8(5)	$\langle 3,4\rangle^-$			69Ha15								
5130.2(2)	$\langle 2,3\rangle^+$			67Bj02			38		46			
5162.5(5)	$\langle 1,2^+\rangle$					98(6)	2(2)	<26				
5201.1(4)	$\langle 1–3\rangle^-$						≤2.6					
5210.0(10)	1^+					35	23(1)	28(1)		1(1)		
5222(4)				67Bj06								
5230.3(3)	$\langle 2–5\rangle^+$			67Bj02					94		6.5	
5289.2(4)	$\langle 2–5\rangle^+$			67Bj02					100			
5300.7(5)												
5324.9(7)							[100]			≤31		
5342.8(8)	2^+			67Bj02			100					
5367(1)							23(21)			77(1)		
5375.1(8)	$\langle 2–5\rangle^+$			67Bj02			100					
5404(4)	$\langle 3,4\rangle^-$			69Ha15								
5459.2(5)	$\langle 2–4\rangle^+$			67Bj02			33		67			
5519(5)				69Ha15								
5548.7(3)	$\langle 2–4\rangle^+$			67Bj02			[31]		[43]	[27]		
5561.0(5)	3^-			69Ha15		10(8)	12(8)					
5655(4)	$\langle 1–6\rangle^-$			69Ha15								
5733.2(3)	$\langle 2–5\rangle^+$			67Bj02					72		15	
5775.7(3)	$\langle 2^+–4^+\rangle$						14		39	5	13	

(continued) **$^{44}_{20}$Ca**

E^*	J^π	L	S_N	Ref.	Branching ratios in percentage						
					E_f^*: 0.0	1157	1883	2283	2656	3044	3285
[keV]		(d,^{6}Li)	(d,^{6}Li)		J_f^π: 0^+	2^+	0^+	4^+	2^+	4^+	6^+
5800(12)				69Ha15							
5822(10)											
5864(20)	0^+			76Be27							
5866.6(5)	$\langle 2^+–5\rangle$			67Bj02				45			
5881(12)				69Ha15							
5965(10)											
6014(20)				67Bj06							
6040.2(7)	$\langle 2–5\rangle^+$			67Bj02							
6145.7(4)	$\langle 2–5\rangle^+$			67Bj02	4			52			
6211.3(6)											
6438(20)											
6578(20)											
6672.7(5)										22	
6744(20)											
6778(20)											
6913(20)											
6996(20)				67Bj06							
7044(20)											
7844(20)											
8050											
8290											
8860											
9460											
9750											
11850(10)	2^-										
				Ref.							
			78Fo32	Ref.							

Energy levels and branching ratios [90En08, 98En04, 99Ca45]. Part 3 **$^{44}_{20}$Ca**

E^*	J^π					Branching ratios in percentage					
		E_f^*:	3301	3308	3357	3580.6	3661.5	3676.1	3712.0	3776.3	3913.7
[keV]		J_f^π:	2^+	3^-			1			2	5^-
3661.53(1)	1			0.2(1)							
3676.10(2)	$\langle 1^–3^-\rangle$		1.5(4)	17.3(3)							
3712.0(2)	$\langle 3–5\rangle^-$			74(20)							
4011.5(5)									100		
4358.44(3)	3^-			37(6)				5(3)	6(2)		
4409.17(2)	$\langle 1–3\rangle^-$		9.3(6)	0.2(2)			29(2)	2.3(10)			
4552.65(3)	$\langle 1–3\rangle^-$			18.4(7)	1.0(9)		2.1(8)	38.4(8)			
4564.8(2)	5^-										68
4584.0(2)	$\langle 2^+–4^+\rangle$			4.9							

(continued) **$^{44}_{20}$Ca**

E^*	J^π	Branching ratios in percentage								
	E^*_f:	3301	3308	3357	3580.6	3661.5	3676.1	3712.0	3776.3	3913.7
[keV]	J^π_f:	2^+	3^-			1			2	5^-
4804.2(6)	$\langle 1^-,2^+\rangle$		x							
4866.10(10)	$\langle 1,2^+\rangle$				≤6					
4884.02(8)	$\langle 1–3\rangle^-$		25(8)			70(7)				
5005.7(2)	4^+			37						3.6
5025.7(2)	3^-					15(15)				
5096.8(5)	$\langle 3,4\rangle^-$									100
5130.2(2)	$\langle 2,3\rangle^+$			16						
5201.1(4)	$\langle 1–3\rangle^-$		100				x			
5210.0(10)	1^+	12(5)								
5230.3(3)	$\langle 2–5\rangle^+$			<69						
5300.7(5)								100		
5561.0(5)	3^-						78(59)			
5733.2(3)	$\langle 2–5\rangle^+$			12						
5775.7(3)	$\langle 2^+–4^+\rangle$	10					19			
5866.6(5)	$\langle 2^+–5\rangle$			10						
6040.2(7)	$\langle 2–5\rangle^+$			100						
6211.3(6)										100
6672.7(5)									12	

Energy levels and branching ratios [90En08, 98En04, 99Ca45]. Part 4 **$^{44}_{20}$Ca**

E^*	J^π	Branching ratios in percentage			
	E^*_f:	3923	4092.0	4094.0	4584.0
[keV]	J^π_f:				
5733.2(3)	$\langle 2–5\rangle^+$		<30		
5866.6(5)	$\langle 2^+–5\rangle$			45	
6145.7(4)	$\langle 2–5\rangle^+$	x	44		
6672.7(5)					66

Energy levels and branching ratios [92Bu01]. **$^{45}_{20}$Ca**

E^*	$2J^\pi$	L	S'	S'	$d\sigma/d\Omega$	L	C^2S	C^2S	$T_{1/2}$ or	Ref.	Branching ratios in percentage			
											E^*_f: 0.0	174	1435	1554
[keV]			(d,p)	(d,p)	μb/sr		(d,t)	(τ,α)	Γ_{cm}		$2J^\pi_f$: 7^-	5^-	3^-	$\langle 11^-\rangle$
0.0	7^-	3	2.9		1970	3	6.0	4.6	162.61(9) d	74Br19				
174.27(2)	5^-	3	0.65		40	⟨3⟩	<0.1		0.40(4) ns	77Sc05	100			
1434.7(1)	3^-	1	0.40(4)	0.43	3360	1	0.15		1.1(2) ps	74Br19	33(2)	67(2)		
1554.4(1)	$\langle 11^-\rangle$				20				>2.1 ps	67Ra15	100			
1558(10)														

(continued) **$^{45}_{20}$Ca**

E^*	$2J^\pi$	L	S'	S'	$d\sigma/d\Omega$	L	C^2S	C^2S	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
											E_f^*:	0.0	174	1435	1554
[keV]			(d,p)	(d,p)	μb/sr		(d,t)	(τ,α)	Γ_{cm}		$2J_f^\pi$:	7^-	5^-	3^-	$\langle 11^-\rangle$
1584(6)					15					67Ra15					
1879.9(2)	3^+								0.05(3) ps			0.37(3)	99.6(1)		
1884.4(4)		2	0.12(1)		170	2	3.3	1.8		74Br19			100		
1899.9(1)	3^-	1	2.2	2.35	20600	$\langle 1\rangle$	<0.1		1.1(1) ps	74Br19		27(2)	65(2)	8(1)	
1940.2(1)															100
1973(6)	5^-,7^-	3	0.08(1)		87					74Br19					
2249.1(1)	1^-	1	0.30(3)	0.35	3320				0.43(7) ps	74Br19			47(7)	29(4)	
2353.8(2)	1^+–5^+				40				4.7(11) ns	67Ra15		88(1)	6.1(5)	5.4(4)	
2392.3(1)	1^+	0	0.10(1)		3600	0	0.9		0.19(4) ps	74Br19		0.1(1)	0.2(1)	75(4)	
2523.1(4)	$\langle 3$–$7\rangle$											18(1)	74(8)		
2599(6)					20					67Ra15					
2683(6)	$\langle 3,5\rangle$				50					67Ra15		x			
2771.1(2)	1^+–5^+				40					67Ra15		0.3(1)	42(5)	41(7)	
2786(12)															
2842.0(2)	3^-	1	0.34(4)	0.40	4020	1	0.15		22(6) fs	74Br19		37(5)	44(6)		
2878.0(1)	$\langle 15^-\rangle$								>2.1 ps						100
2953(6)					50					67Ra15					
2976.8(5)	5^-	3	0.34(4)		370				42(19) fs	74Br19		22(2)	78(2)		
3023.7(4)	1,3,5												100		
3035(6)					20					67Ra15					
3151(6)					20					67Ra15					
3241.3(2)	3^-	1	0.14(2)	0.13	1830				36(12) fs	74Br19		x	81(12)		
3278(6)					20					67Ra15					
3294.5(3)	3^+,5^+	$\langle 2\rangle$	0.01		100					74Br19		31(2)	45(2)	7(1)	
3322(6)	5^-,7^-	3	0.28(3)		250					74Br19					
3348(12)															
3418.3(1)	1^-			0.68					35(7) fs				28(5)	12(4)	
3442(10)	1^-,3^-	1	0.49(5)		6750					74Br19					
3463(10)					18					67Ra15					
3490.7(5)	3^-,5^+											46(5)			
3556.0(1)															100
3560(10)	$\langle 1^+\rangle$					$\langle 0\rangle$	0.1			71Yn02					
3654.0(5)	1,3,5											22(4)	78(4)		
3675(12)															
3705.0(6)	1,3,5				30					67Ra15		100			
3753(10)					40					67Ra15					
3783.2(2)	1^-,3^-	1	0.08(1)	0.11	1180				<26 fs	74Br19			100		
3838.0(2)	$\langle 1\rangle^-$	1	0.19(2)	0.24	2230				<15 fs	74Br19				67(13)	
3941.8(1)															
3993(10)	5^-,7^-	3	0.33(4)		400					74Br19					
4048(10)					40					67Ra15					
4115(10)					40					67Ra15					
4177(10)	5^-,7^-	3	0.12(1)		120					74Br19					
4258(10)					120					67Ra15					
4286(10)					280					67Ra15					

(continued) **$^{45}_{20}$Ca**

E^* [keV]	$2J^\pi$	L	S' (d,p)	S' (d,p)	$d\sigma/d\Omega$ μb/sr	L	C^2S (d,t)	C^2S (τ,α)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: 0.0 174 1435 1554 $2J_f^\pi$: 7^- 5^- 3^- $\langle 11^-\rangle$
4312(10)	$\langle 1^-,3^-\rangle$	$\langle 1\rangle$	0.01		370					74Br19	
4388(10)					200					67Ra15	
4421(10)					250					67Ra15	
4467.7(10)	$1^-,3^-$	1	0.04(1)		1150					74Br19	
4511(10)	$\langle 1^-,3^-\rangle$	$\langle 1\rangle$	0.05(1)		910					67Ra15	
4559(10)					150					67Ra15	
4615.7(2)	1^-	1	0.34(4)	0.40	4950				<12 fs	74Br19	31(9)
4695(10)		$\langle 3,4\rangle$			250					67Ra15	
4750(10)	$3^+,5^+$	2	0.17(2)		2110					74Br19	
4762(10)	1^+	0	0.01		incl					74Br19	
4810(10)	$1^-,3^-$	1	0.08(1)		1250					74Br19	
4837(10)	$3^+,5^+$	2	0.12(1)		1420					74Br19	
4885(10)	$\langle 5^-,7^-\rangle$	$\langle 3\rangle$	0.05		120					74Br19	
4919(10)	1^+	0	0.030		2880					74Br19	
4981(10)	1^+	0	0.01		250					74Br19	
4999.69(19)	$\langle 1\rangle^-$	1	0.36(4)	0.47	5340				<9.7 fs	74Br19	13(9)
5047(10)	1^+	0	0.02		2100					74Br19	
5079(10)					20					67Ra15	
5128(10)	$\langle 1^+\rangle$	$\langle 0\rangle$	0.01		740					74Br19	
5164					130					67Ra15	
5201(10)	1^+	0	0.01		1140					74Br19	
5237(3)	$1^-,3^-$	1	0.04(1)		840					74Br19	
5285(10)					200					67Ra15	
5309					150					67Ra15	
5324(10)	$3^+,5^+$	2	0.07(1)		420					74Br19	
5352(10)	1^+	0	0.01		1400					74Br19	
5373(10)	$1^-,3^-$	1	0.02							74Br19	
5390(10)	$7^+,9^+$	4	0.50(5)		250					74Br19	
5417(10)	$3^+,5^+$	2	0.03		460					74Br19	
5440(10)	$1^-,3^-$	1	0.03		440					74Br19	
5479(10)	1^+	0	0.01		1490					74Br19	
5521(10)	$7^+,9^+$	4	0.30(3)		200					74Br19	
5551(10)					400					67Ra15	
5569(10)					360					67Ra15	
5598(10)					700					67Ra15	
5629(10)					1160					67Ra15	
5687(10)					600					67Ra15	
5716(10)					550					67Ra15	
5742(10)	$\langle 3^+,5^+\rangle$	$\langle 2\rangle$	0.05		300					67Ra15	
5764(10)	$5^-,7^-$	3	0.48(5)		350					67Ra15	
5792(10)					70					67Ra15	
5818(10)	1^+	0	0.02		830					74Br19	
5846(10)	$1^-,3^-$	1	0.02		200					74Br19	
5892(10)	$3^+,5^+$	2	0.04(1)		280					67Ra15	
5915(10)					500					67Ra15	

(continued) **$^{45}_{20}$Ca**

E^* [keV]	$2J^\pi$	L	S' (d,p)	S' (d,p)	$d\sigma/d\Omega$ μb/sr	L	C^2S (d,t)	C^2S (τ,α)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: 0.0 174 1435 1554 $2J_f^\pi$: 7^- 5^- 3^- $\langle 11^-\rangle$
5948(10)					240					67Ra15	
5967(10)					300					67Ra15	
5990(10)					450					67Ra15	
6018(10)					150					67Ra15	
6051(10)					200					67Ra15	
6077(10)					300					67Ra15	
6106(10)					500					67Ra15	
6234(10)					500					67Ra15	
6301(10)					600					67Ra15	
			83Bu21	87Ka28			71Yn02	71Ra35		Ref.	
					67Ra15					Ref.	

Additional data on this isotope can be found in [89Ra06, 82En06, 71Ra35, 69Yn01, 67Bj05].

Values S' in the first column are from the evaluation [83Bu21] where a general agreement in data [67Ra15, 74Br19, 77Sc05] was found; values $d\sigma/d\Omega$ are from [67Ra15].

S' for 10 states with ℓ_n=1 were evaluated in [87Ka28] for estimation of direct neutron capture cross section.

Energy levels and branching ratios [92Bu01]. Part 2 **$^{45}_{20}$Ca**

E^* [keV]	$2J^\pi$	E_f^*: $2J_f^\pi$:	1880 3^+	1884.4	1899.9 3^-	1940.2	2249.0 1^-	2353.8	2392.3 1^+	2523.1 $\langle 3,5,7\rangle$	2683 $\langle 3,5\rangle$
2249.1(1)	1^-				25(3)						
2353.8(2)	1^+–5^+				0.26(5)						
2392.3(1)	1^+		12(4)		13(1)						
2523.1(4)	$\langle 3$–$7\rangle$				8(3)						
2771.1(2)	1^+–5^+		9(1)		2.0(3)		0.07(6)	5.7(7)			
2842.0(2)	3^-			15(7)	4(3)						
3241.3(2)	3^-						x				19(12)
3294.5(3)	3^+,5^+									16(2)	
3418.3(1)	1^-						47(7)		5(2)		
3490.7(5)	3^-,5^+								54(5)		
3838.0(2)	$\langle 1\rangle^-$				33(7)						
3941.8(1)						31(9)					
4615.7(2)	1^-				69(13)						
4999.69(19)	$\langle 1\rangle^-$				39(9)				48(26)		

Energy levels and branching ratios [92Bu01]. Part 3 **$^{45}_{20}$Ca**

E^*	$2J^\pi$		Branching ratios in percentage		
		E_f^*:	2842.0	2877.99	3556.01
[keV]		$2J_f^\pi$:	3^-	$\langle 15^- \rangle$	
3418.3(1)	1^-		8(5)		
3941.8(1)				38(19)	31(16)

Energy levels and branching ratios [00Wu08]. **$^{46}_{20}$Ca**

E^*	J^π	L	σ (p,t)	σ (t,p)	I_p	$T_{1/2}$ or	Ref.	Branching ratios in percentage			
								E_f^*:	0.0	1346	2575
[keV]		(p,t)	μb/sr	μb/sr	μb/sr	Γ_{cm}		J_f^π:	0^+	2^+	4^+
0.0	0^+			1900	7700	Stable	67Wi15				
1346.0(3)	2^+			220	650	3.6(3) ps	67Bj06		100		
2423.1(8)	0^+			388	1000	>4.5 ps	67Bj06			100	
2574.7(5)	4^+		>60	32	130		67Bj06			100	
2973.9(6)	6^+	6	≤85			10.4(5) ns	73Da02				100
3022.6(10)	2^+			158	480		67Bj06		39(18)	61	
3614.0(9)	3^-	3	35	120	200		67Bj06			100	
3638.9(12)	2^+			incl	190		67Bj06				
3859.7(13)	4^+	⟨4⟩	6	35	200		67Bj06				
3952(2)											
3988(3)	$\langle 3^- \rangle$										
4184.5(15)	5^-	5	15				73Da02				
4261(2)											
4407.0(14)	3^-	3	121				73Da02				
4430.2(9)	2^+			427	1500		67Bj06				
4489.4(12)	$\langle 4^+ \rangle$										
4728.8(18)	5^-	5	162				73Da02				
4744.9(24)	$\langle 4^+ \rangle$			258	1600		67Bj06				
4758(3)	0^+			incl							
4994.7(20)	$\langle 4^+ \rangle$				450		67Bj06				
5013.6(20)											
5051(3)	$\langle 4^+ \rangle$	⟨4⟩	8				73Da02				
5151.6(26)	$\langle 4^+ \rangle$	⟨4⟩	6				73Da02				
5218(4)											
5251.5(28)	4^+	⟨4⟩	6				73Da02				
5317(3)	0^+			500	1100		67Bj06				
5379.6(24)	$\langle 3^- \rangle$	3	25				73Da02				
5392(4)											
5416.7(24)											
5436.7(24)	4^+										
5474(4)	$\langle 3^- \rangle$										
5536.7(23)	$\langle 4^+ \rangle$	⟨4⟩	10		370		67Bj06				
5600(4)	0^+			3380	4200		67Bj06				
5628(10)	0^+			incl	2800		67Bj06				

(continued) **$^{46}_{20}$Ca**

E^* [keV]	J^π	L (p,t)	σ (p,t) μb/sr	σ (t,p) μb/sr	I_p μb/sr	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: 0.0 J_f^π: 0^+	1346 2^+	2575 4^+
5638(3)										
5679										
5690(4)										
5722(3)										
5781.6(27)					420		67Bj06			
5821(4)										
5850.9(27)			8				73Da02			
5863.0(28)	$\langle 6^+ \rangle$									
5958(4)	$\langle 2^+ \rangle$	$\langle 2 \rangle$	11				73Da02			
5987(4)	$\langle 6^+ \rangle$									
6010(4)										
6036(4)	$\langle 4^+ \rangle$									
6047(15)	$\langle 0^+ \rangle$				670		67Bj06			
6077(5)										
6116(5)	$\langle 2^+ \rangle$		7				73Da02			
6156(5)										
6201(5)										
6252(5)	$\langle 4^+ \rangle$									
6267(5)	2^+			428	2200		67Bj06			
6309(5)										
6372(15)	2^+			657	3100		67Bj06			
6555(15)	$\langle 0^+ \rangle$		23	347	810		67Bj06			
6626(15)	2^+			230	1400		67Bj06			
6745(15)										
6836(15)										
6964(15)										
7025(15)	$\langle 2^+ \rangle$			350	1800		67Bj06			
7055(7)	5^-,6^+									
7098(15)										
7168(15)										
7233(15)	$\langle 0^+ \rangle$									
7267(15)	$\langle 0^+ \rangle$									
7311(15)										
7380(15)										
7438(15)										
7490(6)	$\langle 2^+ \rangle$									
7503(15)										
7667(14)	2^+,5^-									
7738(15)										
≈7830	0^+									
7914(8)										
8382(5)	7^-									
8770(50)	7^-									
9070(50)	5^-									
9680(50)	5^-–8^+									

(continued) **$^{46}_{20}$Ca**

E^* [keV]	J^π	L (p,t)	σ (p,t) μb/sr	σ (t,p) μb/sr	I_p μb/sr	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: 0.0 J_f^π: 0^+	1346 2^+	2575 4^+
12660(50)	6^+–7^-									
13020(40)	1^+					0.022(7) fs				
13130(50)	6^+–7^-									
13895(30)										
14488(30)	3^-									
14610(30)										
14795(30)	5^-									
15279(30)	3^-									
15847(30)										
16155(30)	$\langle 0^+ \rangle$									
16721(30)	$\langle 2^+ \rangle$									
≈17295										
			73Da02	67Wi15	67Bj06		Ref.			

Additional data on this isotope can be found in [79Pe08, 65Be11].
Abundance: 0.004(3) %.
9 levels in high energy region could be analogs of levels in ^{46}K.
For 13 low-lying states (n, n) configuration was found by the study of the $(\alpha,^2\text{He})$ reaction [90Fi07].
Data for this isotope are considered in vol. LB I/18A.

Energy levels and branching ratios [95Bu05, 01Br35]. **$^{47}_{20}$Ca**

E^* [keV]	$2J^\pi$	$2T$	L (d,p)	C^2S (d,p)	S' (d,p)	L (p,d)	C^2S (p,d)	L (τ,α)	C^2S (τ,α)	C^2S (τ,α)	C^2S (d,t)	$T_{1/2}$ or Γ_{cm}	Ref.
0.0	7^-		3	2.1		3	6.7(14)	3	5.42	6.94	6.22	4.536(3) d	72Ma23
2013.5(1)	3^-		1	3.9	3.60	1	0.02(1)	$\langle 1 \rangle$	0.03	0.04	0.10	>6 ps	72Ma23
2578.3(1)	3^+		2	0.08		2	3.6(8)	2	1.74	2.23	1.18	>12 ps	72Ma23
2599.7(1)	1^+		0	0.05		0	1.8(4)	0	1.08	1.38	1.28	>1 ps	72Ma23
2849(5)	$\langle 1^-,3^- \rangle$		1	0.10		0+1	0.03+0.05				0.03		77Wi12
2875.2(2)	$\langle 1^-,3^- \rangle$		1	0.53	0.51								66Be08
3267(8)	$\langle 5^-,7^- \rangle$							$\langle 3 \rangle$	0.01	0.02			85Ha08
3296(5)	$\langle 1^- \rangle$		1	0.07				$\langle 3 \rangle$	0.03	0.04			66Be08
3425(5)	7^-					3	0.07(2)	$\langle 3 \rangle$	0.10	0.13	0.21		72Ma23
3562.4	$\langle 9^- \rangle$												01Br35
3844(8)	$\langle 7^+,11^- \rangle$												
3877(8)	$\langle 5^- \rangle$												
3933.8	$\langle 5^-,7^- \rangle$					$\langle 3 \rangle$		$\langle 3 \rangle$	0.06	0.08			85Ha08
3999.4	$\langle 13 \rangle$												01Br35
4019(5)	$1^-,3^-$		1	0.06									66Be08
4057.8(2)	$1^-,3^-$		1	1.2	1.10			$\langle 1 \rangle$	0.01	0.01			66Be08
4103(5)	$\langle 3^+,5^+ \rangle$							$\langle 2 \rangle$	0.03	0.05			85Ha08
4205(8)	$\langle 7^+,9^+ \rangle$							4	0.01	0.01			85Ha08

(continued) **$^{47}_{20}$Ca**

E^* [keV]	$2J^\pi$	$2T$	L (d,p)	C^2S (d,p)	S' (d,p)	L (p,d)	C^2S (p,d)	L (τ,α)	C^2S (τ,α)	C^2S (τ,α)	C^2S (d,t)	$T_{1/2}$ or Γ_{cm}	Ref.
4386(8)	$\langle 7^+\rangle$												
4402.6	$[1^-]$		1	0.07									66Be08
4455(8)													
4531(8)	$\langle 3^+\rangle$												
4584(8)	$\langle 5^+\rangle$												
4611(8)	$\langle 5^+\rangle$												
4714(8)	$\langle 9^-\rangle$												
4785(5)	$5^-,7^-$		3	0.81				$\langle 3\rangle$	0.01	0.01			66Be08
4809.2(2)	$[3^-]$		1	0.30	0.28								66Be08
4880(8)	$\langle 13^-\rangle$												
4918(8)	$\langle 9^-\rangle$												
4960(8)	$3^+,5^+$							2	0.02	0.03			85Ha08
4980(8)	$3^+,5^+$					2	0.22(5)	2	0.14	0.20			72Ma23
5053(8)	$\langle 7^+\rangle$						incl						72Ma23
5189(5)	$1^-,3^-$		1	0.24									66Be08
5220(5)													
5254(5)	$3^+,5^+$							2	0.01	0.01			85Ha08
5305(5)	$3^+,5^+$		1	0.06		2	0.17(4)	2	0.08	0.12			72Ma23
5325(5)	$7^+,9^+$		4	1.7									66Be08
5427(5)			3	0.47									66Be08
5459(5)	$3^+,5^+$		3	0.74		2	0.18(4)	2	0.14	0.19			72Ma23
5488(5)	$1^-,3^-$		1	0.09									66Be08
5503.4(3)	1–5^+												
5550(8)													
5588(8)													
5639(5)			3	0.54									66Be08
5760(5)	$\langle 1^-,3^-\rangle$		$\langle 1\rangle$	0.08									66Be08
5785(8)	1^+							0	0.04	0.06			85Ha08
5809(5)			3	0.68									66Be08
5842(5)			3	0.76									66Be08
5866(5)	$1^-,3^-$		1	0.04									65Bj02
5875(8)	$3^+,5^+$							2	0.02	0.03			85Ha08
5916(8)													
5963(8)	$\langle 5^-,7^-\rangle$							$\langle 3\rangle$	0.01	0.01			85Ha08
6062(5)	$3^+,5^+$		3	1.0				2	0.20	0.28			66Be08
6127(15)	$3^+,5^+$							2	0.02	0.03			85Ha08
6158(15)													
6191(10)													
6253(12)	$3^+,5^+$					2	0.21(4)	2	0.12	0.17			72Ma23
6276(16)	$3^+,5^+$							2	0.05	0.07			85Ha08
6366(10)													
6465(12)	$3^+,5^+$							2	0.08	0.12			85Ha08
6540(15)	$3^+,5^+$							2	0.03	0.04			85Ha08
6610(15)	$3^+,5^+$							2	0.02	0.03			85Ha08
6635(15)	$3^+,5^+$							2	0.10	0.14			85Ha08

(continued) **$^{47}_{20}$Ca**

E^* [keV]	$2J^\pi$	$2T$	L (d,p)	C^2S (d,p)	S' (d,p)	L (p,d)	C^2S (p,d)	L (τ,α)	C^2S (τ,α)	C^2S (τ,α)	C^2S (d,t)	$T_{1/2}$ or Γ_{cm}	Ref.
6670(15)	$3^+,5^+$							2	0.05	0.07			85Ha08
6719(15)	$\langle 5^-,7^-\rangle$							$\langle 3\rangle$	0.01	0.01			85Ha08
6760(15)	$\langle 5^-,7^-\rangle$							$\langle 3\rangle$	0.02	0.02			85Ha08
6878(12)	$\langle 5^-,7^-\rangle$							$\langle 3\rangle$	0.03	0.04			85Ha08
6920(15)	$\langle 3^+,5^+\rangle$							$\langle 2\rangle$	0.01	0.01			85Ha08
7023(12)													
7063(15)	$\langle 5^-,7^-\rangle$							$\langle 3\rangle$	0.03	0.04			85Ha08
7117(15)													
7151(15)	$3^+,5^+$							2	0.10	0.15			85Ha08
7296(12)	$3^+,5^+$							2	0.07	0.09			85Ha08
7415(15)	$3^+,5^+$							2	0.08	0.10			85Ha08
7489(14)	$3^+,5^+$							2	0.11	0.15			85Ha08
7545(15)													
7642(15)													
7679(15)													
7736(15)	$3^+,5^+$							2	0.03	0.05			85Ha08
7785(15)													
7842(15)													
7893(15)	1^+							0	0.03	0.04			85Ha08
7893(15)	$3^+,5^+$							2	0.01	0.02			85Ha08
7954(15)	$3^+,5^+$							2	0.03	0.04			85Ha08
7995(15)													
8021(15)	1^+							0	0.02	0.03			85Ha08
8121(15)	1^+							0	0.02	0.03			85Ha08
8264(15)	$\langle 5^-,7^-\rangle$							$\langle 3\rangle$					
8301(15)	$3^+,5^+$							2	0.03	0.04			85Ha08
8352(15)	$3^+,5^+$							2	0.02	0.04			85Ha08
8380(15)	1^+							0	0.04	0.05			85Ha08
8447(15)													
8595(15)	1^+							0	0.01	0.01			85Ha08
8595(15)	$3^+,5^+$							2	0.01	0.02			85Ha08
8669(15)	1^+							0	0.01	0.01			85Ha08
8669(15)	$3^+,5^+$							2	0.03	0.04			85Ha08
8748(15)	1^+							0	0.01	0.01			85Ha08
8748(15)	$3^+,5^+$							2	0.02	0.03			85Ha08
8902(15)													
8995(15)													
9124(15)	1^+							0	0.02	0.03			85Ha08
9230(15)	$3^+,5^+$							2	0.03	0.04			85Ha08
9271(15)	$\langle 5^-,7^-\rangle$							$\langle 3\rangle$	0.02	0.03			85Ha08
9341(15)	1^+							0	0.02	0.02			85Ha08
9451(15)	1^+							0	0.02	0.03			85Ha08
9545(15)	$3^+,5^+$							2	0.05	0.07			85Ha08
9612(15)													
9678(15)	$3^+,5^+$							2	0.04	0.05			85Ha08

(continued) **$^{47}_{20}$Ca**

E^* [keV]	$2J^\pi$	$2T$	L (d,p)	C^2S (d,p)	S' (d,p)	L (p,d)	C^2S (p,d)	L (τ,α)	C^2S (τ,α)	C^2S (τ,α)	C^2S (d,t)	$T_{1/2}$ or Γ_{cm}	Ref.
9720(15)	1^+							0	0.01	0.01			85Ha08
9720(15)	3^+,5^+							2	0.01	0.01			85Ha08
9776(15)	1^+							0	0.01	0.01			85Ha08
9776(15)	3^+,5^+							2	0.01	0.02			85Ha08
9830(15)													
9924(15)													
9978(15)	3^+,5^+							2	0.06	0.08			85Ha08
10056(15)	3^+,5^+							2	0.04	0.06			85Ha08
10182(15)	3^+,5^+							2	0.06	0.08			85Ha08
10238(15)													
10302(15)	3^+,5^+							2	0.09	0.13			85Ha08
10358(15)	3^+,5^+							2	0.09	0.12			85Ha08
10431(15)	3^+,5^+							2	0.08	0.11			85Ha08
10485(15)	3^+,5^+							2	0.07	0.11			85Ha08
10581(15)	3^+,5^+							2	0.07	0.11			85Ha08
10640(15)	3^+,5^+							2	0.06	0.09			85Ha08
10680(15)	3^+,5^+							2	0.06	0.09			85Ha08
10765(15)	1^+							0	0.07	0.10			85Ha08
11003(15)	3^+,5^+							2	0.11	0.16			85Ha08
11187(15)													
11580(15)													
11826(15)													
12737(5)	1^+	9				0	0.10(2)	0	0.26	0.18			72Ma23
13084(5)	$\langle 3\rangle^+$	9				2	0.18(4)	2	0.74	0.46			72Ma23
16218(15)	3^+,5^+	$\langle 9\rangle$				2	0.06(2)						72Ma23
18149(20)	$\langle 5^-$,$7^-\rangle$					$\langle 3\rangle$	$\langle 0.04(1)\rangle$						72Ma23
20445(20)													
20778(20)													
									78Fo34	78Fo34			Ref.
				66Be08	87Ka28		72Ma23		85Ha08		77Wi12		Ref.

Additional data on this isotope can be found in [01Br35, 85Ha08, 82En06, 78Fo34, 69Yn01, 65Bj02].

For the ground state (J^π=7/2$^-$) parameter C^2S from neutron pickup reactions (p,d) and (d,t) was found to be close to the theoretically expected value 8.0 [71Ra35, 91Ra11].

S' for 4 states with ℓ_n=1 were evaluated in [87Ka28] for estimation of direct neutron capture cross section.

Two parameters C^2S of the (τ,α) reaction were obtained [78Fo34] by different theoretical model assumptions: SE (separation energy procedure) and IDP (isospin-dependent potential) in DWBA-analysis.

Energy levels and branching ratios [95Bu05, 01Br35]. Part 2

$^{47}_{20}$Ca

E^*	$2J^\pi$	Branching ratios in percentage		
		E_f^*:	0.0	2013.54
[keV]		$2J_f^\pi$:	7^-	3^-
2013.5(1)	3^-		100	
2578.3(1)	3^+		29.7(12)	70.3(13)
2599.7(1)	1^+		1.29(9)	98.7(18)
2875.2(2)	$\langle 1^-,3^-\rangle$			100
4057.8(2)	$1^-,3^-$			100
4531(8)	$\langle 3^+\rangle$			100
4809.2(2)	$[3^-]$			100
5503.4(3)	$1–5^+$			100

Energy levels and branching ratios [93Bu04].

$^{48}_{20}$Ca

E^*	J^π	L	I_p	L	$\beta_L R$	EWSR	β_L	$\Gamma_\circ$	$B(E2)$	$S(p,\gamma)$	$T_{1/2}$ or	Ref.
[keV]		(t,p)	*rel.*		fm	%	(p,p′)	[meV]		[eV]	Γ_{cm}	
0.0	0^+	0	100(5)								$>6{\cdot}10^{18}$ yr	
3831.72(6)	2^+	2	43(6)	2	0.61	7.82	0.122	13(1)	97(11)		41.8(26) fs	85Ha08
4283.33(10)	0^+	0	60(18)	0	0.05	0.13					223(11) ps	88Fu01
4503.34(9)	4^+		26(4)								1.53(3) ns	
4506.96(5)	3^-			3	0.76	6.85	0.23				9.4(13) ps	85Se14
4612.00(8)	$3^{\langle+\rangle}$			$\langle 4\rangle$			0.05				1.2(4) ps	72Gr27
4695.4(3)	1							14(1)	0.38(3)			02Ha13
5145.60(10)	3,4,5			5	0.16	0.14	0.05				<0.69 ns	88Fu01
5260.60(9)	$4^{\langle-\rangle}$			$\langle 5\rangle$			0.03				5.1(+14-8) ps	72Gr27
5311.43(8)	2^+										232(+28-13) fs	
5314(7)	$\langle 1\rangle^-$			1								88Fu01
5369.84(7)	3^-			3	0.38	2.04	0.11				1.80(14) ps	88Fu01
5461(5)	0^+	0	160(8)	0	0.08	0.34						88Fu01
5729.33(11)	5^-			5	0.37	0.79	0.11				0.90(+49-21) ps	88Fu01
6104.83(8)	$1^-–4^+$						0.03				139(+17-28) fs	72Gr27
6336.8(20)	2^+	2	170(9)								191(29) fs	
6345.01(10)	4^+			4	0.32	1.00	0.08				180(+35-13) fs	89Fu07
6480												
6614.2(5)	$1^{\langle-\rangle}$			$\langle 1\rangle$				240(10)	2.4(2)*			88Fu01
6648.99(10)	4^+			4	0.24	0.60	0.06				114(+42-28) fs	88Fu01
6685.80(10)	$2^{\langle-\rangle}$			1,2							69(+56-52) fs	88Fu01
6791.5(20)	1										<6.9 fs	
6805.35(13)	2^+	2	98(5)	2	0.10	0.35					83(+44-38) fs	88Fu01
6830.5(5)	$\langle 3^-\rangle$			$\langle 3\rangle$	0.05	0.05						88Fu01
6895.79(9)	$\langle 2^-\rangle$			$\langle 2\rangle$	0.05	0.10	0.03				55(+83-55) fs	88Fu01
6897(5)	$\langle 5^+\rangle$			$\langle 5\rangle$	0.08	0.04						88Fu01
7007.3(5)	3^-			3	0.13	0.30					69(+18-14) fs	88Fu01
7009	$\langle 0–2\rangle$											

(continued) **$^{48}_{20}$Ca**

E^* [keV]	J^π	L (t,p)	I_p *rel.*	L	$\beta_L R$ fm	EWSR %	β_L (p,p′)	$\Gamma_\circ$ [meV]	$B(E2)$	$S(p,\gamma)$ [eV]	$T_{1/2}$ or Γ_{cm}	Ref.
7031.9(5)	3^-,5^+			3	0.06	0.07						88Fu01
				+6	+0.1	0.08						88Fu01
7160												
7286(5)	$\langle 1^- \rangle$											
7298.6(20)	1							2240(130)	16.5(10)		<6.9 fs	02Ha13
7301.5(5)				3	0.05	0.05						88Fu01
7370.6(20)	$\langle \leq 2 \rangle$											
7400.87(11)	$\langle 2^- \rangle$			1,2			0.03					88Fu01
7407.3(5)												
7440.6(20)	$2,3^-$										177.4(70) fs	
7469(4)	4^+			4	0.11	0.13						88Fu01
7497.17(15)												
7537(6)	$[3^-]$			3	0.08	0.12						88Fu01
7568.5(5)	≤ 4											
7655.7(2)	1							210(10)	1.4(1)			02Ha13
7659(3)	3^-			3	0.41	3.34	0.11					88Fu01
7696	$\langle 1^+,2^+ \rangle$											
7784(10)	3^-											
7800(5)	4^+			4	0.19	0.41	0.05					88Fu01
7911(7)	3^-			3	0.06	0.09						88Fu01
7915.4(9)	2							21(3)	4.2(7)			02Ha13
7953(15)	$\langle 2^-,6^- \rangle$											
7956(6)	$\langle 4 \rangle^+$			4	0.08	0.08						88Fu01
8001(8)												
8027.6(4)	2^+		30(5)	2	0.10	0.48		40(4)	7.5(8)			88Fu01
8047	$0^-,1^+$											
8065(7)	5^-			5	0.14	0.16						88Fu01
8105(12)	1^+–3^+			2	0.04	0.06						88Fu01
8150	$1^+,2^+$											
8178(8)	4^+			4	0.05	0.03						88Fu01
8236(8)	4^-–6^-			5	0.12	0.12						88Fu01
8248(8)	4^+			4	0.21	0.58						88Fu01
8283(4)	4^+		50(8)	4	0.25	0.79	0.05					89Fu07
8356(8)	5^-			5	0.13	0.15						88Fu01
8386(1)	1^-			1				2.8(3)	12.5(8)*			88Fu01
8385(18)	$\langle 3^- \rangle$			$\langle 5 \rangle$			0.06					72Gr27
8388(8)	$\langle 6 \rangle^+$			6	0.16	0.16						88Fu01
8437(4)	3^-			3	0.10	0.21						88Fu01
8467												
8471(6)	3^+–5^+		51(8)	4	0.07	0.07						89Fu07
8517(1)	1							98(17)	0.45(8)			02Ha13
8522(4)	3^-		52(8)	3	0.27	1.58	0.06					88Fu01
8531			68(10)									
8564(5)	$\langle 6^- \rangle$			$\langle 6 \rangle$	0.22	0.30	0.06					88Fu01
8572	$\langle 3 \rangle$											

(continued) **$^{48}_{20}$Ca**

E^* [keV]	J^π	L (t,p)	I_p *rel.*	L	$\beta_L R$ fm	EWSR %	β_L (p,p′)	$\Gamma_\circ$ [meV]	$B(E2)$	$S(p,\gamma)$ [eV]	$T_{1/2}$ or Γ_{cm}	Ref.
8604(5)	3^-		31(2)	3	0.24	1.27	0.06					88Fu01
8680(5)	$\langle 3^+ \rangle$											
8698(8)			89(5)									
8788(8)			42(3)									
8797(8)	4^+			4	0.21	0.60						89Fu07
8806(5)	$4^- – 6^-$			$\langle 5 \rangle$			0.05					72Gr27
8831(7)	$2^- – 4^-$			3	0.06							88Fu01
8876(10)	$\langle 5 \rangle^-$			5	0.16							88Fu01
8884(1)	2^+			2	0.25			1160(10)	124(9)			88Fu01
8920(7)												
8956(9)												
8967												
8982(8)	3^-			3	0.17							88Fu01
9034(1)	1^-			1				1850(240)	7.0(9)*			88Fu01
9049(7)	2^+			2	0.10							88Fu01
9079(9)												
9130(10)	$1^+ – 3^+$			2	0.05							88Fu01
9138(22)												
9158(9)	$\langle 4 \rangle^+$			4	0.08	0.08						88Fu01
9176(9)	2^+			2	0.10							88Fu01
9214(9)	3^-			3	0.07							88Fu01
9227(1)								11(4)	0.040(15)	0.28(11)		02Ha13
9227(1)	$0^- – 2^-$			$\langle 1 \rangle$								88Fu01
9295(1)	$2^{\langle + \rangle}$							1950(120)	174(11)			02Ha13
9292(7)	1^-			1								88Fu01
9307	$\langle 8^- \rangle$											
9334(9)												
9366(7)	$5^+ – 7^+$			6	0.09							88Fu01
9392	$\langle 1^+, 2^+ \rangle$											
9429.1	$2^- – 4^-$			3	0.05					2.8(11)		88Fu01
9432.5												02Ha13
9472.8(8)	1^-			1				1810(150)	6.1(5)*			88Fu01
9496(9)												
9537.9								≤80	≤0.26			02Ha13
9545.7(2)	1^-			1				3270(210)	10.8(7)*			88Fu01
9550(20)	$\langle 3^- \rangle$											
9568(7)	$\langle 5^+ – 7^+ \rangle$			$\langle 6 \rangle$	0.10							88Fu01
9604.6								≤1670	≤5.4	5(2)		02Ha13
9621(7)	4^+			4	0.13	0.27						88Fu01
9638(9)	$2^- – 4^-$			3	0.10							88Fu01
9655.6								≤70	≤0.22	0.22(9)		02Ha13
9691(9)	$\langle 0^- – 2^- \rangle$			$\langle 1 \rangle$								88Fu01
9728(7)	$2^- – 4^-$			3	0.14							88Fu01
9765(7)	3^-			3	0.18							88Fu01
9784(9)	$\langle 3^+ – 5^+ \rangle$			$\langle 4 \rangle$	0.07	0.08						88Fu01

(continued) **$^{48}_{20}$Ca**

E^* [keV]	J^π	L (t,p)	I_p *rel.*	L	$\beta_L R$ fm	EWSR %	β_L (p,p′)	$\Gamma_\circ$ [meV]	$B(E2)$	$S(p,\gamma)$ [eV]	$T_{1/2}$ or Γ_{cm}	Ref.
9785.3								≤330	≤1.0	1.0(4)		02Ha13
9802.2	$\langle 1\rangle^-$			1				≤120	≤37	0.37(15)		88Fu01
9811.1								≤90	≤0.27	0.27(11)		02Ha13
9829.2								≤270	≤0.82	0.8(3)		02Ha13
9854.5								≤370	<1.11	1.1(4)		02Ha13
9865.2	3^-			3	0.10			1460	4.36(146)	6(2)		88Fu01
9869.3								470(180)	1.4(5)	3.1(12)		02Ha13
9885	$1^+,2^+$											
9894(7)				3+6	≈0.1							88Fu01
9921.4	3^-			3	0.10			≤140	≤41	0.43(17)		88Fu01
9942(9)	2^-–4^-			3	0.07							88Fu01
9953(27)	$\langle 8^-\rangle$											
9954	$\langle 1^+,2^+\rangle$											
9992(7)	4^+			4	0.09	0.13						89Fu07
10065(10)	$\langle 4\rangle^+$			4	0.07	0.07						88Fu01
10080(7)	$\langle 3\rangle^-$			3	0.07							88Fu01
10107(7)	4^+			4	0.12	0.21						88Fu01
10126(7)	1^-			1								
10138	$\langle 1^+,2^+\rangle$											
10151(7)	3^-			3	0.11							
10182(7)	3^-			3	0.12							
10191(10)	3^-			3	0.10							
10220(4)	1^+			1								80St17
10240												
10265(10)												
10318(7)	3^-			3	0.08							88Fu01
10330	$\langle 1^+,2^+\rangle$											
10345(7)	3^-			3	0.11							88Fu01
10354	$\langle 1^+,2^+\rangle$											
10370(10)	$\langle 2\rangle^+$			2	0.04							88Fu01
10399(10)	3^+–5^+			4	0.07	0.07						88Fu01
10433(10)	1^+–3^+			2	0.04							88Fu01
10483(10)	3^-			3	0.11							88Fu01
10521(10)	$\langle 2\rangle^+$			2	0.05							88Fu01
10531(10)	$\langle 0^-$–$2^-\rangle$			$\langle 1\rangle$								88Fu01
10563(10)				1,2								88Fu01
10586(10)	$\langle 4\rangle^+$			4	0.08	0.09						88Fu01
10611(10)	3^-			3	0.13							88Fu01
10623(10)												
10648(10)	$\langle 3\rangle^-$			3	0.10							88Fu01
10686(10)	3^-			3	0.14							88Fu01
10731(10)	2^+			2	0.07							88Fu01
10745(10)												
10765(10)												
10782(10)	$\langle 1^+,2^+\rangle$											

(continued) **$^{48}_{20}$Ca**

E^* [keV]	J^π	L (t,p)	I_p *rel.*	L	$\beta_L R$ fm	EWSR %	β_L (p,p′)	$\Gamma_\circ$ [meV]	$B(E2)$	$S(p,\gamma)$ [eV]	$T_{1/2}$ or Γ_{cm}	Ref.
10803(10)	$\langle 3^- \rangle$			$\langle 3 \rangle$	0.07							88Fu01
10822(10)	3^-			3	0.09							88Fu01
10857(10)	2^+			2	0.08							88Fu01
10872(10)	5^+–7^+			6	0.09							88Fu01
10883(10)	$\langle 2^+ \rangle$			$\langle 2 \rangle$	0.06							88Fu01
10916(10)	$\langle 3 \rangle^-$			3	0.11							88Fu01
10936(10)	$\langle 1^+,2^+ \rangle$											
10955(10)	4^+			4	0.12	0.26						88Fu01
11013(11)												
11032												
11037(11)	$\langle 2^+ \rangle$			$\langle 2 \rangle$	0.05							88Fu01
11050(11)	$\langle 3^+$–$5^+ \rangle$			$\langle 4 \rangle$	0.07	0.09						88Fu01
11098(11)	$\langle 4^+ \rangle$			$\langle 4 \rangle$	0.09	0.14						89Fu07
11125(11)	3^+–5^+			4	0.06	0.05						88Fu01
11153(11)												
11183(11)	$\langle 5^- \rangle$			$\langle 5 \rangle$	0.09							88Fu01
11219(11)												
11230(11)												
11248(11)	$\langle 4 \rangle^+$			4	0.09	0.14						88Fu01
11281(11)	2^+			2	0.05							88Fu01
11329(11)	3^-			3	0.07							88Fu01
11376(11)	3^-			3	0.14							88Fu01
11421(11)	$\langle 1^+,2^+ \rangle$											
11433(11)	1^+–3^+			2	0.06							88Fu01
11447(11)	2^-–4^-			3	0.06							88Fu01
11466(11)												
11485(11)	$\langle 2^-$–$4^- \rangle$			$\langle 3 \rangle$	0.05							88Fu01
11508(11)	2^+			2	0.10							88Fu01
11530(11)	3^-			3	0.10							88Fu01
11550(11)												
11589(11)	0^-–2^-			1								88Fu01
11622(11)	$\langle 4^+ \rangle$			$\langle 4 \rangle$	0.09	0.13						88Fu01
11639(11)	$\langle 1^+$–$3^+ \rangle$			$\langle 2 \rangle$	0.04							88Fu01
11671(11)	$\langle 4^-$–$8^- \rangle$				0.06							88Fu01
11693(11)	5^-			5	0.11							88Fu01
11715(11)	$\langle 1^+$–$3^+ \rangle$			$\langle 2 \rangle$	0.05							88Fu01
11752(11)	$\langle 2 \rangle^+$			2	0.05							88Fu01
11773(11)												
11816(11)	2^-–4^-			3	0.05							88Fu01
11828(11)												
11848(11)												
11913(11)	3^-			3	0.09							88Fu01
11945(11)	$\langle 0 \rangle^+$			0	0.07							88Fu01
11967(11)	$\langle 0 \rangle^+$			0	0.07							88Fu01
12009(12)	$\langle 3^- \rangle$			$\langle 3 \rangle$	0.10							88Fu01

(continued) **$^{48}_{20}$Ca**

E^* [keV]	J^π	L (t,p)	I_p *rel.*	L	$\beta_L R$ fm	EWSR %	β_L (p,p′)	$\Gamma_\circ$ [meV]	$B(E2)$	$S(p,\gamma)$ [eV]	$T_{1/2}$ or Γ_{cm}	Ref.
12029(12)	3^-			3	0.08							88Fu01
12051(12)				⟨1⟩								88Fu01
12090(12)	⟨2^-–4^-⟩			⟨3⟩	0.05							88Fu01
12107(12)	4^-–6^-			5	0.08							88Fu01
12123(12)	0^-–2^-			1								88Fu01
12162(12)	3^+–5^+			4	0.08	0.12						88Fu01
12176(12)												
12216(12)	4^-–6^-			5	0.05							88Fu01
12270	⟨1^+,2^+⟩											
12271(12)	⟨3^+–5^+⟩			⟨4⟩	0.10	0.20						88Fu01
12318(12)	⟨0⟩$^+$			0	0.09							88Fu01
12339(12)	⟨1,2⟩$^+$			2	0.11							88Fu01
12369(12)	⟨3^+–5^+⟩			⟨4⟩	0.06	0.07						89Fu07
12422(12)	1^+–3^+			2	0.07							88Fu01
12441(12)	2^-–4^-			3	0.09							88Fu01
12476(12)												
12499(12)	⟨1^+,2^+⟩											
12540(12)	1^+–3^+			2	0.07							88Fu01
12565(12)	⟨0⟩$^+$			0	0.09							88Fu01
12620(12)	1^+–3^+			2	0.07							88Fu01
12658(12)												
12667(12)												
12704(12)	⟨1^+,2^+⟩											
12757(12)	1^+–3^+			2	0.06							88Fu01
12798(12)	1^+–3^+			2	0.10							88Fu01
12846(12)												
12869(12)	⟨0^+⟩			⟨0⟩	0.06							88Fu01
12925(12)				2	0.05							88Fu01
12968(12)	⟨2^-–4^-⟩			⟨3⟩	0.08							88Fu01
13030(13)	4^-–6^-			5	0.07							88Fu01
13065(13)	⟨1^+–3^+⟩			⟨2⟩	0.06							88Fu01
13098(13)	1^+–3^+			2	0.06							88Fu01
13169(13)	0^-–2^-			1								88Fu01
13223(13)												
13256(13)	2^-–4^-			3	0.08							88Fu01
13290(13)												
13360(13)	1^+–3^+			2	0.09							88Fu01
13403(13)	1^+–3^+			2	0.06							88Fu01
13439(13)												
13475(13)	1^+–3^+			2	0.06							88Fu01

(continued) **$^{48}_{20}$Ca**

E^*	J^π	L	I_p	L	$\beta_L R$	EWSR	β_L	$\Gamma_\circ$	$B(E2)$	$S(p,\gamma)$	$T_{1/2}$ or	Ref.
[keV]		(t,p)	*rel.*		fm	%	(p,p′)	[meV]		[eV]	Γ_{cm}	
13493(13)			67Bj06		88Fu01	88Fu01		02Ha13	02Ha13	02Ha13		Ref.

Additional data on this isotope can be found in [02Ha13, 01Kr01, 01Br35, 01Ba66, 00Ha34, 99St12, 98Br30, 89Fu07, 85Se14, 83Ch12, 82Be14, 82Fu02, 80St17, 72Gr27, 72Lo10, 69Bl09].
Abundance: 0.187(21) %.
* $B(E1)$ in units $10^{-3}e^2fm^2$; in the case of E2 transition its strength is expressed in the same column in units e^2fm^4 [02Ha13]; inelastic neutron scattering was studied in [92Va06].
Parameters of (p,p′) reaction $\beta_L R$ [88Fu01] and β_L [72Gr27] are commented in [93Bu04, 85Al14].
Data for this isotope are considered in vol. LB I/18A.

Energy levels and branching ratios [93Bu04]. Part 2 **$^{48}_{20}$Ca**

E^*	J^π		Branching ratios in percentage								
		E_f^*:	0.0	3832	4283	4503	4507	4612	5146	5261	5369
[keV]		J_f^π:	0^+	2^+	0^+	4^+	3^-	$3^{\langle+\rangle}$	3–5	$4^{\langle-\rangle}$	3^-
3831.72(6)	2^+		100								
4283.33(10)	0^+		x	100							
4503.34(9)	4^+			100							
4506.96(5)	3^-		20(2)	80(1)							
4612.00(8)	$3^{\langle+\rangle}$			100							
5145.60(10)	3,4,5					100					
5260.60(9)	$4^{\langle-\rangle}$						86(3)	14.4(9)			
5311.43(8)	2^+		13(1)	83(1)			4.7(7)				
5369.84(7)	3^-			53(2)		15(1)	16(2)	15(2)			
5729.33(11)	5^-					39(9)				61(3)	
6104.83(8)	1^-–4^+			12(1)			88(4)				
6336.8(20)	2^+		100								
6345.01(10)	4^+					73(6)		15(4)	12(6)		
6614.2(5)	$1^{\langle-\rangle}$		100								
6648.99(10)	4^+					46(6)		23(1)	31(3)		x
6685.80(10)	$2^{\langle-\rangle}$						14(3)	11(4)			75(6)
6791.5(20)	1		100								
6805.35(13)	2^+			42(13)		58(6)					
6830.5(5)	$\langle 3^-\rangle$			100							
6895.79(9)	$\langle 2^-\rangle$			18(4)			52(4)	12(3)			19(3)
6897(5)	$\langle 5^+\rangle$										x
7007.3(5)	3^-			100							
7031.9(5)	3^-,5^+						100			x	
7298.6(20)	1		17(3)	83(6)							
7301.5(5)			99					0.5			0.5
7370.6(20)	$\langle\leq 2\rangle$		100								
7400.87(11)	$\langle 2^-\rangle$		0.9(1)	4.7(3)			3.8(3)	72(4)			12.8(18)

(continued) $^{48}_{20}$Ca

E^*	J^π		Branching ratios in percentage								
		E_f^*:	0.0	3832	4283	4503	4507	4612	5146	5261	5369
[keV]		J_f^π:	0^+	2^+	0^+	4^+	3^-	$3^{\langle+\rangle}$	3–5	$4^{\langle-\rangle}$	3^-
7440.6(20)	$2,3^-$		100								
7568.5(5)	≤ 4			100							
7659(3)	3^-		x				x	x			
8027.6(4)	2^+		x			x	x				
8047	$0^-,1^+$		x								
8236(8)	4^-–6^-					x	x				
8248(8)	4^+						x	x			
8283(4)	4^+		x				x	x			
8386(1)	1^-		x								
8467			14	86							
8471(6)	3^+–5^+					x	x				
8522(4)	3^-						x	x			
8531			30	50	20						
8604(5)	3^-						x	x			
8680(5)	$\langle 3^+\rangle$						x	x			
8788(8)							x	x			
8797(8)	4^+						x	x			
8806(5)	4^-–6^-						x	x			
8967			100								
9295(1)	$2^{\langle+\rangle}$		100								
9292(7)	1^-		100								

Energy levels and branching ratios [93Bu04]. Part 3 $^{48}_{20}$Ca

E^*	J^π		Branching ratios in percentage				
		E_f^*:	5729	6614	6685	6805	6830
[keV]		J_f^π:	5^-	$\langle 1^-\rangle$	$2^{\langle-\rangle}$	2^+	$\langle 3^-\rangle$
7400.87(11)	$\langle 2^-\rangle$				5.9(18)		
7407.3(5)				100			
7497.17(15)			100				
7784(10)	3^-						100
7956(6)	$\langle 4\rangle^+$						x
8283(4)	4^+					x	
8386(1)	1^-						x

Energy levels and branching ratios [95Bu23, 01Br35]. **$^{49}_{20}$Ca**

E^* [keV]	$2J^\pi$	L	C^2S (d,p)	S' (d,p)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage			
							E_f^*:	0.0	2023	3351	4010
							$2J_f^\pi$:	3^-	1^-	$\langle 9^+\rangle$	7^+
0.0	3^-	1	0.84(12)	3.56	8.718(6) m	94Uo02					
2023.2(3)	1^-	1	0.91(15)	2.06	<5.5 fs	94Uo02		100			
3357.2	$\langle 7^-\rangle$		$\langle 0.004\rangle$			97Be45		100			
3585.0(8)	5^-	3	0.11		40(+23-16) fs	94Uo02		100			
3866.6	$\langle 3^-\rangle$	$\langle 1\rangle$	0.008			78Ab05		100			
3991(2)	5^-	3	0.84		9.7(+49-35) fs	94Uo02		100			
4017.5	$\langle 9^+\rangle$	4	0.14		0.6(+4-2) ps	94Uo02				100	
4072(1)	3^-	1	0.13(2)		60(+21-19) fs	94Uo02		100			
4261	1^-	1	0.12(1)			94Uo02					
4272(1)	1^-				25(+22-17) fs			53(9)	47(9)		
4416(2)	5^+	2	0.039		<32 fs	94Uo02		100			
4617(6)											
4760.8	$\langle 5^+\rangle$	$\langle 2\rangle$	$\langle 0.021\rangle$			94Uo02					
4788(6)		$\langle 4\rangle$	$\langle 0.053\rangle$			75Me15					
4885(3)	9^+	4	0.020			94Uo02				20(4)	80(16)
5136.6						01Br35					
5165.5											
5251.3											
5309	1				59(34) eV						
5378	9^+	4	0.083			94Uo02					
5443.9	1^-				<6.1 keV						
5539.5	3^-				3.3(18) keV						
5553	≥ 5										
5568	1^-										
5587.7	1^-				4.3(27) keV						
5612											
5684.0						01Br35					
5722											
6076	5^+	2	0.069			94Uo02					
6257	1										
6262											
6330(20)	$\langle 1^+–5^+\rangle$										
6376	$\langle 5^+\rangle$										
6425	3				10 keV						
6443	3				3 keV						
6492	3^-				8 keV						
6513	5^+										
6529	9^+	4	0.14			94Uo02					
6595											
6707	5^+										
6753	9^+	4	0.085			94Uo02					
6882											
6924	5^+										
6971											
7070	5^+										

(continued) **$^{49}_{20}$Ca**

E^* [keV]	$2J^\pi$	L	C^2S (d,p)	S' (d,p)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: 0.0 / $2J_f^\pi$: 3^-	2023 1^-	3351 $\langle 9^+\rangle$	4010 7^+
7070	≥ 7									
7335	$\langle 1^+$–$5^+\rangle$									
7428	$\langle 1^+$–$5\rangle$									
7529	$\langle 9^+\rangle$	$\langle 4\rangle$	$\langle 0.034\rangle$			94Uo02				
7612										
7705	$\langle 9^+\rangle$	$\langle 4\rangle$	$\langle 0.027\rangle$			94Uo02				
7872										
8140(70)										
8390(80)	$\langle 1^+$–$5^+\rangle$									
8670(90)										
9100										
9280(100)										
9580(110)										
10100(130)										
			94Uo02	87Ka28		Ref.				

Additional data on this isotope can be found in [01Br35, 89Ra06, 85Fu09, 75Me15, 64Ka03].
S_n^+=1.0 for the ground state was found in measurement of (^{13}C,^{12}C) reaction in [72Ra40].

Energy levels and branching ratios [95Bu09, 05Br18]. **$^{50}_{20}$Ca**

E^* [keV]	J^π	L (t,p)	σ (t,p) *rel.*	I_p arb.u	L (α,^{2}He)	N (α,^{2}He)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: 0.0 / J_f^π: 0^+	1026 2^+
0.0	0^+	0	100	100(5)	0	380(280)	13.9(6) s	95Bu09		
1027(1)	2^+	2	42	108(5)	2	140(40)		67Bj06	100	
2999(2)		2	36	103(5)	4	90(35)		67Bj06		100
3519(15)			2	3.2(5)						
3997(2)	$\langle 3^-\rangle$	3	21	66(10)	4	90(35)		67Bj06		
4035(1)	$1,2^+$								67	33
4470(15)		$\langle 0\rangle$	2.2	4.6(7)				68Br01		
4515(2)	4^+	3		9.3(15)		90(35)		67Bj06		
4830(3)	$\langle 4^-\rangle$	$\langle 4\rangle$		110(33)				67Bj06		
4880(1)	$1,2^+$	1						95Bu09	100	
4970(50)	$\langle 4^+,5^-\rangle$				4+5			90Fi07		
5043(15)		1						95Bu09		
5085.0(30)	$\langle 4^-\rangle$							05Br18		
5110.1(30)	$\langle 5^-\rangle$			50(8)				05Br18		
5147.6(30)	$\langle 5^+\rangle$			incl				05Br18		
5281(20)										
5362(20)										
5434(20)										
5517.3(30)	$\langle 5^-\rangle$	$\langle 4\rangle$						95Bu09		

(continued) **$^{50}_{20}$Ca**

E^* [keV]	J^π	L (t,p)	σ (t,p) *rel.*	I_p arb.u	L (α,^{2}He)	N (α,^{2}He)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: 0.0 1026 J_f^π: 0^+ 2^+
5576(20)		⟨4⟩						95Bu09	
6510(10)									
6870.1(50)	⟨7$^-$⟩							05Br18	
7630(50)									
8380(50)	⟨7$^-$⟩				7	60(25)		90Fi07	
8430(70)									
8660(80)									
8880(70)									
8980(50)	⟨7$^-$⟩				7	60(25)		90Fi07	
9240(100)									
9770(150)									
9800(50)	⟨6$^+$⟩				6	45–60		90Fi07	
10330(50)	⟨8$^+$⟩				8	60–40		90Fi07	
10430(170)									
10540(180)									
11050(190)									
11470(190)									
		67Bj06	68Br01	67Bj06	90Fi07	90Fi07		Ref.	

Additional data on this isotope can be found in [98Ba80].

For 9 low-lying states (n, n) configuration was found by the study of the (α,^{2}He) reaction [90Fi07]; presented values are normalization factors N expressed as $d\sigma/d\Omega_{exp} = N(\Delta\varepsilon)d\sigma/d\Omega_{DWBA}$ [90Fi07]. It was noted in [95Bu09] that results from the (α,2p) reaction are discrepant in the various experiments.

Energy levels and branching ratios [97Zh09]. **$^{51}_{20}$Ca**

E^* [keV]	$2J^\pi$	$T_{1/2}$ or Γ_{cm}	Branching ratios in percentage E_f^*: 0.0 $2J_f^\pi$: $\langle 3^- \rangle$
0.0	⟨3$^-$⟩	10.0(8) s	
1240(40)			
1940(40)			
3462(1)	⟨1$^+$–5$^+$⟩		100
3530(2)	⟨1,3,5⟩		100
4040(40)			
5190	⟨1–5⟩		
5520	⟨1$^+$–5$^+$⟩		
5910(40)			
6040	⟨1$^+$–5$^+$⟩		
6650	⟨1$^+$–5$^+$⟩		
6820	⟨1$^+$–5$^+$⟩		

(continued) **$^{51}_{20}$Ca**

E^* [keV]	$2J^\pi$	$T_{1/2}$ or Γ_{cm}	Branching ratios in percentage E_f^*: 0.0 $2J_f^\pi$: $\langle 3^- \rangle$
7450	$\langle 1^+ – 5^+ \rangle$		
7910	$\langle 1^+ – 5^+ \rangle$		

Energy levels and branching ratios [00Hu06]. **$^{52}_{20}$Ca**

E^* [keV]	J^π	$T_{1/2}$ or Γ_{cm}	Branching ratios in percentage E_f^*: 0.0 J_f^π: 0^+
0.0	0^+	4.6(3) s	
2563.1(10)	$\langle 2^+ \rangle$		x
5570			
5800			
7010			
8210			
9190			