Energy levels and branching ratios [95Bu05]. **$^{47}_{24}$Cr**

E^* [keV]	$2J^\pi$	$I_{^6\mathrm{He}}$ (^{3}He,^{6}He)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage							
					E_f^*:	0.0	99.4	175.1	472.0	870	1333.2	1346
					$2J_f^\pi$:	3^-	1,5	$\leq 7^-$	3,7	1,5		
0.0	3^-	5	500(15) ms	77Mu03								
98	5^-		$\leq$2.1 ns	02To05		100						
172	7^-	26	$\leq$2.1 ns	02To05		1.4	$\approx$99					
472.0	3,7	17		77Mu03		85	15					
870	1,5	2		77Mu03		71	7		21			
1329	11^-	6		02To05				100				
1346		incl					12		38	50		
1451(9)		4		77Mu03								
1541(15)		2		77Mu03								
1831(8)		15		77Mu03								
1957	1,5,9							28		67		5
2131(9)		12		77Mu03								
2247(15)		2		77Mu03								
2406(10)												
2557(10)												
2619		7		77Mu03							22	74
2655.5	15^-			02To05							100	
2848(10)												
3430(10)		3		77Mu03								
3471												
3504(11)		3		77Mu03								
3747(11)		3		77Mu03								
3768												
4135	19^-			02To05								
4169(12)		3		77Mu03								
4216												
4295(12)		6		77Mu03								
5376												
5409(15)		6		77Mu03								
5901	23^-			02To05								
7375	25^-			02To05								
7729												
7907	27^-			02To05								
9841												
10018	31^-			02To05								
	02To05	77Mu03		Ref.								

Additional data on this isotope can be found in [02To05, 99Be23].

$I_{^6\mathrm{He}}$ is a yield of ^{6}He from three-neutron pickup reaction (^{3}He,^{6}He) measured at 10° [77Mu03].

Energy levels and branching ratios [95Bu05]. Part 2 **$^{47}_{24}$Cr**

E^*	$2J^\pi$		Branching ratios in percentage								
		E^*_f:	1957	2619	2655.5	3471	3768	4140	5376	5906	7729
[keV]		$2J^\pi_f$:	1,5,9								
2619			4								
3471			95	5							
3768					100						
4135	19^-				95		5				
4216				80		20					
5376								100			
5901	23^-							88	12		
7729										100	
9841											100

Energy levels and branching ratios [93Bu04]. **$^{48}_{24}$Cr**

E^*	J^π	L	I_t	ε	σ (τ,n)	$d\sigma/d\Omega$	R	$T_{1/2}$ or	Ref.
[keV]		(p,t)	*rel.*	(p,t)	μb/sr	(τ,n)	(τ,n)	Γ_{cm}	
0.0	0^+	0	112	1.13	1250(50)	0.76	1.64	21.56(3) h	71Do18
752.16(12)	2^+	2	45	0.94				7.3(8) ps	71Do18
1858.39(18)	4^+	4	6	0.34				1.3(4) ps	71Do18
3420(20)	$\langle 0^+\rangle$								
3445.2(12)	6^+	$\langle 6,5\rangle$	3					<0.35 ps	71Do18
3533.5(3)	$\langle 5^+\rangle$		6					3.3(8) ns	71Do18
3630(5)	$2^+,3^-$	2	27						71Do18
4064.2(3)	$\langle 6^+\rangle$		72					28(7) ps	71Do18
4067(5)	3^-	3							
4280(5)	$\langle 0^+\rangle$	0	4	0.11					71Do18
4428.7(3)	$\langle 4\rangle^+$	$\langle 4\rangle$	15						71Do18
4512	$\langle 7^+\rangle$								
4640(10)	2^+	2	9						71Do18
4653.0(3)	$3^+,4^+$								
4876(6)	$\langle 4$–$7\rangle$								
5032.5(3)	$3^+,4^+$								
5189.0(14)	$\langle 8\rangle^+$							0.52(17) ps	
5294.1(6)	3^+–5^+								
5430(30)	0^+				590(60)	1.15	0.51		75Al05
5608.2(5)	$\langle 3^+,4^+\rangle$								
5670(20)	$\langle 0^+\rangle$	$\langle 0\rangle$							72Sh27
5792.72(24)	4^+	4	12						71Do18
5960(10)	$\langle 0^+\rangle$	$\langle 0\rangle$	3						71Do18
6100(10)	2^+	2	51						71Do18
6420(10)	$\langle 5^-\rangle$	$\langle 5\rangle$	9						71Do18
6855(10)	0^+	0	6						71Do18
7066.9(22)	$\langle 10^+\rangle$							<0.69 ps	

(continued) $^{48}_{24}$Cr

E^* [keV]	J^π	L (p,t)	I_t *rel.*	ε (p,t)	σ (τ,n) μb/sr	$d\sigma/d\Omega$ (τ,n)	R (τ,n)	$T_{1/2}$ or Γ_{cm}	Ref.
7550(10)			24						71Do18
7940(30)									
8414	$\langle 12^+ \rangle$								
8750(15)*	0^+	0	21		660(60)	1.23	0.54		71Do18
9040									
9180									
9530(30)	0^+				1090(50)	1.22	0.90		75Al05
9900(30)									
10436	$\langle 13^+ \rangle$								
10615	$\langle 14^+ \rangle$								
11320(30)	0^+				600(200)	1.13	0.5		75Al05
					75Al05	75Al05			Ref.
							75Al05		Ref.

Additional data on this isotope can be found in [04Dh02, 02Sa21, 02Le21, 00De10, 98Br28, 94Ca04, 71Br52].

* Identified by [71Do18, 75Mo26] as doublet T=2 (J^π=0^+) with 10(2) keV splitting [85Al14].

Parameter ε=(2L+1)$d\sigma/d\Omega_{exp}$/N$d\sigma/d\Omega_{DWBA}$ of two-neutron transfer is given here for $(1f_{7/2})^2$ neutron configuration, see details in [72Sh27].

Triton yield in (p,t) reaction (in units number of tracks per 1/2 mm strip) was measured at 11° and proton energy 51 MeV [71Do18].

For two-proton transfer reaction (τ,n) experimental cross sections σ (τ,n)=$d\sigma/d\Omega_{exp}$ at 0°, calculated $d\sigma/d\Omega_{DWBA}$ and their ratio R=$d\sigma/d\omega_{exp}/d\sigma/d\omega_{DWBA}$ are from [75Al05].

Branching ratios are given in Supplement.

Energy levels and branching ratios [93Bu04]. Part 2 $^{48}_{24}$Cr

E^*	J^π		Branching ratios in percentage											
		E_f^*:	0.0	752	1858	3445	3533	4064	4429	4653	5032	5189	7067	8414
[keV]		J_f^π:	0^+	2^+	4^+	6^+	$\langle 5^+ \rangle$	$\langle 6^+ \rangle$	$\langle 4 \rangle^+$	$3^+,4^+$	$3^+,4^+$	$\langle 8 \rangle^+$	$\langle 10^+ \rangle$	$\langle 12^+ \rangle$
752.16(12)	2^+		100											
1858.39(18)	4^+			100										
3445.2(12)	6^+				100									
3533.5(3)	$\langle 5^+ \rangle$				91	9								
4064.2(3)	$\langle 6^+ \rangle$						100							
4428.7(3)	$\langle 4 \rangle^+$			95(9)	5.1(15)									
4512	$\langle 7^+ \rangle$					100								
4653.0(3)	$3^+,4^+$			100										
4876(6)	$\langle 4–7 \rangle$						100	x						
5032.5(3)	$3^+,4^+$			81(15)	19(5)									
5189.0(14)	$\langle 8 \rangle^+$					100								
5294.1(6)	3^+–5^+				100									
5608.2(5)	$\langle 3^+,4^+ \rangle$			33(6)	67(12)									

(continued) **$^{48}_{24}$Cr**

E^*	J^π	Branching ratios in percentage											
	E^*_f:	0.0	752	1858	3445	3533	4064	4429	4653	5032	5189	7067	8414
[keV]	J^π_f:	0^+	2^+	4^+	6^+	$\langle 5^+\rangle$	$\langle 6^+\rangle$	$\langle 4\rangle^+$	$3^+,4^+$	$3^+,4^+$	$\langle 8\rangle^+$	$\langle 10^+\rangle$	$\langle 12^+\rangle$
5792.72(24)	4^+			41(5)		3.2(8)	≈1.5	38(2)	11.6(8)	5.0(5)			
7066.9(22)	$\langle 10^+\rangle$										100		
8414	$\langle 12^+\rangle$											100	
10436	$\langle 13^+\rangle$												100
10615	$\langle 14^+\rangle$												100

Energy levels and branching ratios [95Bu23]. **$^{49}_{24}$Cr**

E^*	$2J^\pi$	$2T$	L	C^2S	σ (τ,α)	L	C^2S	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
										E^*_f:	0.0	272	1083	1561	1703
[keV]				(p,d)	μb/sr	(τ,α)	(τ,α)	Γ_{cm}		$2J^\pi_f$:	5^-	7^-	9^-	11^-	1^-
0.0	5^-		3	0.10	71	3	0.10	42.3(1) m	85Fu03						
271.93(18)	7^-		3	2.00	3850	3	5.22	13(3) ps	85Fu03		100				
1082.5(4)	9^-		[4]		37	$\langle 5\rangle$		0.15(3) ps	78Za03		6(1)	94(1)			
1561.3(4)	11^-				72			0.37(6) ps	78Za03			49(2)	51(2)		
1703.4(4)	1^-		1	0.02	31	1	0.054	>3.8 ps	85Fu03		100				
1741.4(4)	3^-		1	0.05	26	1	0.046	1.1(3) ps	85Fu03		71(2)	29(2)			
1982.2(3)	3^+		2	1.10	930	2	1.63	>1.7 ps	85Fu03		70(2)	11(2)			18(2)
2168.6(4)	5							>3.1 ps			55(2)	45(2)			
2432.1(4)	5^+		2	0.06	70	3	0.08	0.9(+8-3) ps	85Fu03		40(8)	17(1)			
2498.1(6)	13^-							0.16(4) ps					10(4)	90(4)	
2504.0(6)	7^-							<8 fs			67(5)	33(5)			
2578.3(5)	1^+		0	0.93	537	0	0.97		85Fu03						38(5)
2613.2(6)	3^-	1	1	0.11	180	1	0.21	45(14) fs	85Fu03		41(2)	59.2(6)			
2910					20				78Za03						
2985(5)					15				78Za03						
3188.7(7)	$\langle 15^-\rangle$							0.28(7) ps						52(5)	
3250(5)	$\langle 3^- – 7^+\rangle$				220	3	0.30		78Za03		11(1)	51(10)			
3407(5)	$5^-,7^-$		3	0.01					85Fu03						
3511(5)	$\langle 5\rangle^-$		3	0.35	560	3	0.72		85Fu03		52(11)	x	48(10)		
3717(5)	$1^-,3^-$		1	0.01	85	3	0.13		85Fu03						
3893.0(8)	13^-													79	
3913(5)	$1^-,3^-$		1	0.01	120	1	0.05		85Fu03						x
3938(5)	$3^+,5^+$		2	0.10					85Fu03						
3975(5)															
4019(5)	$\langle 1^+\rangle$		$\langle 0\rangle$	0.01	90	0	0.09		85Fu03						
4052(5)	$5^-,7^-$		3	0.05					85Fu03						
4151(5)	$5^-,7^-$		3	0.02					85Fu03						
4186(5)	$\langle 1^+\rangle$		$\langle 0\rangle$	0.02					85Fu03						
4217.2(9)	$\langle 17^-\rangle$														
4259(5)	$3^+,5^+$		2	0.02					85Fu03						
4323(5)															

(continued) **$^{49}_{24}$Cr**

E^* [keV]	$2J^\pi$	$2T$	L (p,d)	C^2S (p,d)	σ (τ,α) μb/sr	L (τ,α)	C^2S (τ,α)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: 0.0 272 1083 1561 1703 $2J_f^\pi$: 5^- 7^- 9^- 11^- 1^-
4365.4(9)	$\langle 19^- \rangle$							1.87(14) ps		
4379(5)										
4426(5)	$5^-,7^-$		3	0.02					85Fu03	
4493(5)	$\langle 3^+,5^+ \rangle$		$\langle 2 \rangle$	0.06					85Fu03	
4559(5)	$3^+,5^+$		2	0.08					85Fu03	
4594(5)	$3^+,5^+$		2	0.09					85Fu03	
4651(5)	$5^-,7^-$		3	0.03					85Fu03	
4698(5)										
4764(5)*	$\langle 7 \rangle^-$	3	3	0.78	1500	3	3.27		85Fu03	6(1) 64(13) 30(6)
4852(5)*	$5^-,7^-$		3	0.07	110	3	0.18		85Fu03	
4879(5)										
4913(5)*	$1^-,3^-$		1	0.04	220	1	0.10		85Fu03	
4942(5)	$\langle 1^-,3^- \rangle$		$\langle 1 \rangle$	0.01					85Fu03	
4994(5)										
5058(5)										
5189(5)	$3^+,5^+$		2	0.10	100	2	0.13		85Fu03	
5273(5)	$5^-,7^-$		3	0.03					85Fu03	
5384(5)	$1^-,3^-$		1	0.03					85Fu03	
5428(5)	$3^+,5^+$		2	0.04					85Fu03	
5495(5)	$1^-,3^-$		1	0.02					85Fu03	
5573(5)*	$\langle 3 \rangle^+$	3	2	0.76	720	2	1.04		85Fu03	25(5)
5625(5)										
5637(5)	$\langle 5^-,7^- \rangle$		$\langle 3 \rangle$	0.03					85Fu03	
5660(5)	$\langle 5^-,7^- \rangle$		$\langle 3 \rangle$	0.02					85Fu03	
5696(5)	$\langle 1^-,3^- \rangle$		$\langle 1 \rangle$	0.03					85Fu03	
5747(5)	1^+		0	0.01					85Fu03	
5784(5)	$\langle 3^+,5^+ \rangle$		$\langle 2 \rangle$	0.02					85Fu03	
5860.8(11)	9,13,17									
5934(5)										
5962.9(11)	$\langle 15,19 \rangle$									
5981(5)	$\langle 3^+,5^+ \rangle$		$\langle 2 \rangle$	0.06	66				85Fu03	
6006(6)	1^+		0	0.02					85Fu03	
6036(6)	$3^+,5^+$		2	0.06	55				85Fu03	
6090(6)	$3^+,5^+$		2	0.07	68				85Fu03	
6127(6)										
6134.9(11)	$\langle 21^- \rangle$									
6278(6)										
6309(6)										
6342(6)										
6380(6)	$\langle 1^-,3^- \rangle$		$\langle 1 \rangle$	0.01					85Fu03	
6410*	1^+				1090	0	0.51		78Za03	
6423(6)	$\langle 1^-,3^- \rangle$		$\langle 1 \rangle$	0.07					85Fu03	
6435.7(11)	7–19									
6470(6)*	1^+	3	0	0.45	1620	0	0.89		85Fu03	
6548(6)	$\langle 3^+,5^+ \rangle$		$\langle 2 \rangle$	0.02					85Fu03	

(continued) $^{49}_{24}$Cr

E^* [keV]	$2J^\pi$	$2T$	L	C^2S (p,d)	σ (τ,α) μb/sr	L (τ,α)	C^2S (τ,α)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: 0.0	$2J_f^\pi$: 5^-	272 7^-	1083 9^-	1561 11^-	1703 1^-
6639(6)															
6705(6)	3^+,5^+		2	0.03					85Fu03						
6734(6)	3^+,5^+		2	0.05					85Fu03						
6765(6)*	1^+		0	0.10	250	0	0.18		85Fu03						
6823(6)	5^-,7^-		3	0.11	230	3			85Fu03						
6884(6)	3^+,5^+		2	0.04					85Fu03						
6948(6)	$\langle 3^+,5^+\rangle$		$\langle 2\rangle$	0.02					85Fu03						
6995(6)	1^-,3^-		1	0.01					85Fu03						
7005(7)															
7084(7)	$\langle 5^-,7^-\rangle$		$\langle 3\rangle$	0.02					85Fu03						
7115(7)															
7161(7)															
7186(7)	$\langle 5^-,7^-\rangle$		$\langle 3\rangle$	0.04					85Fu03						
7225(7)	5^-,7^-		3	0.04					85Fu03						
7264(7)	5^-,7^-		3	0.06					85Fu03						
7271.8(12)															
7308(7)	$\langle 5^-,7^-\rangle$		$\langle 3\rangle$	0.04					85Fu03						
7350(7)															
7391(7)															
7432(7)	$\langle 3^+,5^+\rangle$		$\langle 2\rangle$	0.04					85Fu03						
7480(7)	1^+		0	0.03					85Fu03						
7503(7)															
7537(7)															
7584(7)	1^+		0	0.02					85Fu03						
7601(7)															
7627(7)	1^+		0	0.02					85Fu03						
7635.8(13)															
7889(7)	5^-,7^-		3	0.06					85Fu03						
8007.9(15)	$\langle 23^-\rangle$														
8020(8)	1^+		0	0.02					85Fu03						
8050(8)	1^+		0	0.04					85Fu03						
8092(8)															
8128(8)															
8157(8)															
8231(8)	1^+		0	0.02					85Fu03						
8265(8)	1^+		0	0.04					85Fu03						
8310.8(15)															
8331(8)	1^+		0	0.07					85Fu03						
8368(8)	3^+,5^+		2	0.05					85Fu03						
8405(8)															
8441(8)															
8476(8)	3^+,5^+		2	0.05					85Fu03						
8527(8)	3^+,5^+		2	0.17					85Fu03						
8548(8)															
8557(8)															

(continued) **$^{49}_{24}$Cr**

E^* [keV]	$2J^\pi$	$2T$	L	C^2S (p,d)	σ (τ,α) μb/sr	L (τ,α)	C^2S (τ,α)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E^*_f: 0.0	272	1083	1561	1703 $2J^\pi_f$: 5^-	7^-	9^-	11^-	1^-
8655(8)																		
8683(8)																		
8716(8)	3^+,5^+		2	0.08					85Fu03									
8770(8)																		
8830(8)	$\langle 1^+ \rangle$		$\langle 0 \rangle$	0.02					85Fu03									
8896(8)	$\langle 1^+ \rangle$		$\langle 0 \rangle$	0.01					85Fu03									
9031(9)																		
9064(9)	3^+,5^+		2	0.14					85Fu03									
9123(9)																		
9131(9)																		
9145(9)	3^+,5^+		2	0.06					85Fu03									
9198(9)	$\langle 1^+ \rangle$		$\langle 0 \rangle$	0.02					85Fu03									
9265(9)																		
9292(9)																		
9321(9)																		
9365(9)																		
9399(9)																		
9447(9)	$\langle 3^+$,$5^+ \rangle$		$\langle 2 \rangle$	0.08					85Fu03									
9521(9)																		
9662(9)	$\langle 1^+ \rangle$		$\langle 0 \rangle$	0.01					85Fu03									
9711(9)																		
9745(9)	$\langle 3^+$,$5^+ \rangle$		$\langle 2 \rangle$	0.04					85Fu03									
9788(9)	1^+		0	0.02					85Fu03									
9857(9)																		
9945(9)																		
9968(9)																		
10039(10)																		
10105(10)	$\langle 3^+$,$5^+ \rangle$		$\langle 2 \rangle$	0.08					85Fu03									
10125(10)	$\langle 3^+$,$5^+ \rangle$		$\langle 2 \rangle$	incl					85Fu03									
10170(10)																		
10218(10)																		
10224.0(17)	$\langle 25^- \rangle$																	
10266(10)	1^+		0	0.05					85Fu03									
10302(10)	1^+		0	0.04					85Fu03									
10374(10)	$\langle 3^+$,$5^+ \rangle$		$\langle 2 \rangle$	0.04					85Fu03									
10428(10)																		
10526(10)																		
10702.0(17)	$\langle 27^- \rangle$																	
				85Fu03	78Za03		78Za03		Ref.									

Additional data on this isotope can be found in [99Br40, 99Be23, 91Ca23, 90Ca06, 85Fu03, 71Bl09].

* Members of IAS of ^{49}V [86Bu09].

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

Energy levels and branching ratios [95Bu23]. Part 2 $^{49}_{24}$Cr

E^*	$2J^\pi$		Branching ratios in percentage									
		E_f^*:	1741	1982	2432	2498	2578	2613	3189	3893	3913	3938
[keV]		$2J_f^\pi$:	3^-	3^+	5^+	13^-	1^+	3^-	$\langle 15^- \rangle$	13^-	1^-,3^-	3^+,5^+
2432.1(4)	5^+			43(9)								
2578.3(5)	1^+		62(5)									
3188.7(7)	$\langle 15^- \rangle$					48(5)						
3250(5)	$\langle 3^- – 7^+ \rangle$			38(8)	x							
3893.0(8)	13^-					13			9			
3913(5)	1^-,3^-		x	x			x	x				
4217.2(9)	$\langle 17^- \rangle$					28			72			
4365.4(9)	$\langle 19^- \rangle$								95			
5573(5)*	$\langle 3 \rangle^+$			50(10)	25(5)							
5860.8(11)	9,13,17									100		
6423(6)	$\langle 1^-,3^- \rangle$		9.3(6)	9.3(6)			29(6)	29(6)			23(5)	
6470(6)*	1^+		22(5)	22(5)				23(5)	23(5)			9.3(5)
6765(6)*	1^+		x	x				x	x			x

Energy levels and branching ratios [95Bu23]. Part 3 $^{49}_{24}$Cr

E^*	$2J^\pi$		Branching ratios in percentage								
		E_f^*:	4217	4365	5861	5963	6436	7272	8008	10224
[keV]		$2J_f^\pi$:	$\langle 17^- \rangle$	$\langle 19^- \rangle$	9,13,17	$\langle 15,19 \rangle$			$\langle 23^- \rangle$	$\langle 25^- \rangle$
4365.4(9)	$\langle 19^- \rangle$		5.5							
5962.9(11)	$\langle 15,19 \rangle$		1.1	99						
6134.9(11)	$\langle 21^- \rangle$		59	40.6		<3.1				
6435.7(11)	7–19			15	85					
7271.8(12)					44		56			
7635.8(13)							36	64		
8007.9(15)	$\langle 23^- \rangle$					100				
8310.8(15)							100			
10224.0(17)	$\langle 25^- \rangle$								100	
10702.0(17)	$\langle 27^- \rangle$								50	50

Energy levels and branching ratios [95Bu09]. $^{50}_{24}$Cr

E^*	J^π	L	$(\beta_L R)^2$	L	S_N	σ (τ,n)	$T_{1/2}$ or	Ref.	Branching ratios in percentage					
									E_f^*:	0.0	783	1881	2924	3161
[keV]			(p,p′)		(p,t)	μb/sr	Γ_{cm}		J_f^π:	0^+	2^+	4^+	2^+	2^+
0.0	0^+			0	≈1140	620(50)	$>2\cdot10^{17}$ yr	71Ba46						
783.30(9)	2^+	2	1.13	2	1250(130)	108(20)	8.87(49) ps	95Bu09		100				
1881.29(15)	4^+			4	315(32)		2.22(28) ps	71Ba46			100			
2924.5(3)	2^+	2	0.23	2	840(84)		9.4(14) fs	95Bu09		8(2)	92(5)			

(continued) **$^{50}_{24}$Cr**

E^*	J^π	L	$(\beta_L R)^2$	L	S_N	σ (τ,n)	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
									E_f^*:	0.0	783	1881	2924	3161
[keV]			(p,p′)		(p,t)	μb/sr	Γ_{cm}		J_f^π:	0^+	2^+	4^+	2^+	2^+
3161.1(3)	2^+	2	0.35	2	340(34)		10.9(16) fs	95Bu09			100			
3163.69(20)	6^+						1.25(28) ps					100		
3324.57(20)	4^+	4	0.16				97(25) fs	95Bu09				100		
3594.55(24)	2^+–4^+		x				30(5) fs	66Ma42			59(6)	41(6)		
3602(7)			x					66Ma42						
3611.3(4)	4^+	4	0.32	4	1710(170)		6(4) fs	95Bu09				86(9)		≈7
3629.5(7)	1^+		x				5(3) ps	66Ma42		67(19)	33(15)			
3692(7)	4^+	4	0.20					95Bu09						
3694(8)	0^+			0				71Ba46						
3697.7(6)	1^+–3^+		x				12.8(18) fs	66Ma42			100			
3792.3(5)	5^+		x				9.0(14) ps	66Ma42				51(6)		
3825.4(3)	4^+–6^+											13(1)		
3827	$\langle 0^+ \rangle$		x					66Ma42			100			
3844.3(4)	2^+,3,4^+		x				0.22(6) ps	66Ma42			29(6)	58(6)		13(3)
3850(20)	0^+					160(20)		75Bo14						
3874.9(4)	4^+,5,6^+		x					66Ma42				50(17)		
3895.3(15)	$\langle 1,2 \rangle$		x				24(12) ps	66Ma42			95(50)			
3898(7)	4^+	4	0.046					95Bu09						
3937.7(7)	2^+,3,4^+		x				2.2(10) fs	66Ma42			≈42	50(8)	≈8	
4040	0^+		x					66Ma42						
4051.7(4)	3^-	3	0.46				0.56(11) ps	95Bu09			23(8)		52(5)	21(4)
4070.4(20)	0^+–4^+		x				6.5(17) fs	66Ma42			89(22)			
4129.7(5)	$\langle 1,2^+ \rangle$		x				0.18(6) ps	66Ma42		≈71			27(4)	
4192.9(8)	2^+	2	0.42					95Bu09		≈54	22(5)		19(3)	
4207(7)			x					66Ma42						
4282(7)			x					66Ma42						
4350(30)	0^+			0	≈74			71Ba46						
4363(7)	5^-	5	0.3					95Bu09						
4523.9(12)			x					66Ma42			49(11)		≈7	≈18
4546.2(12)	3^-	3	0.05	3	≈3500			95Bu09			29(12)	≤28	≈24	≈35
4653.5(12)			x					66Ma42			22(6)		70(8)	≈2
4676(7)	2^+	2	0.1					95Bu09						
4728(7)	$\langle 1^+ \rangle$		x					66Ma42						
4740(20)	0^+			0	≈74	85(10)		71Ba46						
4745.0(4)	8^+		x				<2.8 ps	66Ma42						
4772(7)	2^+	2	0.1					95Bu09						
4801(7)			x					66Ma42						
4906(10)			x					66Ma42						
4924(10)	4^+	4	0.16					95Bu09						
4961(10)			x					66Ma42						
4993(10)	0,1,2^-		x					66Ma42			100			
5015(10)														
5039(10)														
5053(10)														
5078(10)														

(continued) **$^{50}_{24}$Cr**

E^* [keV]	J^π	L	$(\beta_L R)^2$ (p,p′)	L	S_N (p,t)	σ (τ,n) μb/sr	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: 0.0 783 1881 2924 3161 J_f^π: 0^+ 2^+ 4^+ 2^+ 2^+
5093(10)									
5198(10)									
5207(10)									
5233(10)	4^+	4	0.22					95Bu09	
5250(10)									
5272(10)									
5297(10)									
5336(10)									
5376(10)									
5429(10)									
5445(10)									
5455(10)									
5548(10)									
5597(10)									
5611(10)									
5623(10)									
5684(10)									
5731(10)	0^+					530(40)		75Bo14	
5741(10)									
5780(10)									
5813(10)									
5835(10)									
5859(10)									
5903(10)									
5929(10)									
5944(10)									
5957(10)									
5983(10)									
6003(10)									
6027(10)									
6032(10)									
6071(10)									
6083(10)									
6116(10)									
6123(10)									
6138(10)									
6175(10)									
6202(10)									
6226(10)									
6230(10)									
6243(10)									
6272(10)									
6305(10)									
6330(10)									
6341.3(5)	10^+						<2.8 ps		

(continued) $^{50}_{24}$Cr

E^* [keV]	J^π	L	$(\beta_L R)^2$ (p,p′)	L	S_N (p,t)	σ (τ,n) μb/sr	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: 0.0 783 1881 2924 3161 J_f^π: 0^+ 2^+ 4^+ 2^+ 2^+
6376(10)									
6450	2^+					170*		74Ev02	
6450(20)	3^-	3	0.07					95Bu09	
6650(20)	3^-	3	0.13					95Bu09	
6790(20)	3^-	3	0.06					95Bu09	
6951.2(7)	11^+								
7340									
7610									
7613.0(9)	12^+						<0.14 ps		
7646	$1,2^+$								x
7780									
7860(20)	3^-	3	0.04					95Bu09	
7980									
8270									
8360(50)									
8425(7)	6^+								
8478(6)	4^+								
8500									
8638									
8650									
8680(20)	3^-	3	0.05					95Bu09	
8813	2^+								
8888	$1^{\langle+\rangle}$						0.75(20) eV		x
9190									
9400									
9570									
9710									
9900(50)	2^+								
9900									
10110									
10240									
10380									
10500(50)									
10520									
10750(30)	2^+					220(30)		75Bo14	
10820									
11020									
11060(50)									
11180									
11400(100)									
11530(50)	0^+					400(50)		75Bo14	
11660									
11680(20)	0^+					190(50)		75Bo14	
11820									
11870(20)	0^+					440(70)		75Bo14	

(continued) **$^{50}_{24}$Cr**

E^*	J^π	L	$(\beta_L R)^2$	L	S_N	σ (τ,n)	$T_{1/2}$ or	Ref.	Branching ratios in percentage					
									E_f^*:	0.0	783	1881	2924	3161
[keV]			(p,p′)		(p,t)	μb/sr	Γ_{cm}		J_f^π:	0^+	2^+	4^+	2^+	2^+
12680(50)														
12790(50)														
12950(50)														
13222(6)	0^+					140(30)		75Bo14						
13900(20)	0^+					300(50)		75Bo14						
14500(30)														
14570(30)														
14900(20)	0^+					390(70)		75Bo14						
			66Ma42		71Ba46	75Bo14		Ref.						

Additional data on this isotope can be found in [04Dh02, 02LeZX, 02Le21, 02Br41, 01Lu14, 01Le31, 00Er01, 72Pe28, 74Pe01, 72Ra14].

Abundance: 4.345(13) %.

* Data from measurements of (τ,n) cross section in [72Ev02, 74Ev02], all other data are from measurements at 0° and 20° in [75Bo14].

For two-neutron pickup reaction (p,t) spectroscopic transition strengths $S_N=(2L+1)\sigma_{exp}/\sigma_{DWBA}$ are from [71Ba46].

For reaction (τ,n) experimental cross sections σ (τ,n)$=d\sigma/d\Omega_{exp}$ at 0°, calculated $d\sigma/d\Omega_{DWBA}$ and their ratio $R=d\sigma/d\omega_{exp}/d\sigma/d\omega_{DWBA}$ can be found also in [75Al05].

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

Energy levels and branching ratios [95Bu09]. Part 2 **$^{50}_{24}$Cr**

E^*	J^π												
		E_f^*:	3164	3325	3595	3611	3629	3698	3792	4052	4745	6341	6951
[keV]		J_f^π:	6^+	4^+	2^+,3,4^+	4^+	1^+		5^+	3^-	8^+	10^+	11^+
3611.3(4)	4^+		≈7										
3792.3(5)	5^+			49(7)									
3825.4(3)	4^+–6^+		87(3)										
3874.9(4)	4^+,5,6^+		33(8)	≈17									
3895.3(15)	⟨1,2⟩		≈5										
4051.7(4)	3^-				≈1	≈2							
4070.4(20)	0^+–4^+					≈4	≈7						
4129.7(5)	⟨1,2^+⟩						≈1						
4192.9(8)	2^+							≈5					
4523.9(12)			≈18						≈7				
4546.2(12)	3^-									≈12			
4653.5(12)			≈4					≈2					
4745.0(4)	8^+		100										
6341.3(5)	10^+										100		
6951.2(7)	11^+										<5.3	100	
7613.0(9)	12^+											<5.3	100

Energy levels and branching ratios [97Zh09].

$^{51}_{24}$Cr

E^* [keV]	$2J^\pi$	L	C^2S (τ,d)	L	C^2S (d,p)	L	C^2S (τ,α)	E^*_{anal} [keV]	L (p,d)	C^2S (p,d)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E^*_f: 0.0 749 777 $2J^\pi_f$: 7^- 3^- 1^-
0.0	7^-	3	0.95	3	2.1	3	5.15		3	4.7	27.702(2) d	69Do01	
749.10(8)	3^-			1	1.2	1	0.07		⟨1⟩	≤0.1	3.3(4) ns	77Ch12	100
776.95(17)	1^-										6.9(6) ns		<0.6 100
1164.59(14)	9^-										76(7) fs		100
1352.65(17)	5^-			3	1.0	3	0.08				3.8(14) ps	77Ba14	34.6(8) 56(1) 9.0(3)
1480.07(16)	11^-	3	0.75								0.55(4) ps	69Do01	52(2)
1557.26(13)	7^-			3	0.56	3	0.03				4.2(10) ps	77Ba14	15.5(3) 79(2)
1899.2(3)	3^-			1	0.54				⟨1⟩	≤0.2	0.28(3) ps	77Ba14	72(2) 21(2) 7(1)
2001.9(2)	5^-	3	0.20								17(2) fs	69Do01	100
2255.5(3)	15^-	3	1.42								46(1) ps	69Do01	
2312.6(2)	7^-			3	0.07	3	1.46		3	2.0	15(4) fs	77Ch12	14(1)
2379.5(1)	9^-										0.31(8) ps		28(4)
2385.4(4)	13^-	3	0.49								59(12) fs	69Do01	
2699(10)	5^-,7^-					3	0.03					78Fo34	
2704.4(2)	$\langle 11\rangle^-$										85(3) fs		3(1)
2762.6(5)	1^+			0	0.03	0	1.24		0	1.3	0.07(1) ps	77Ch12	100
2767.3(2)	9^-	3	0.41								41(8) fs	69Do01	50(3)
2828.5(4)	3^-					1	0.02				59(10) fs	78Fo34	49(6)
2890.2(4)	3^-			1	0.34						0.35(3) ps	77Ba14	<6 15(4)
2908.1(7)				3	0.35							77Ch12	100
2911.0(4)	3^-–7^-					3	0.05				30(10) fs	78Fo34	25(3) 11(2)
2948.2(6)	5^-,7^-			2	0.06	3	0.10				0.12(1) ps	77Ch12	33(2)
2970(8)	3^+,5^+												
3001.7(3)	5^-										15(5) ps		100
3004.4(3)	3^+										0.34(4) ps		45(3)
3016(8)	5^+					2	1.64		2	1.5		78Fo34	
3018.6(6)	11^-										54(16) fs		57(8)
3055.9(6)	1^-			1	0.09						69(35) fs	77Ch12	24(6) 54(15)
3109.2(2)	7^-										54(16) fs		38
3125.9(2)	3^-			1	0.59	1	0.01				83(28) fs	77Ba14	60(8) 26(5)
3134.8(4)	$\langle 3^-\rangle$										45(20) fs		6.00
3180.7(6)	$\langle 17\rangle^-$	3	0.50									69Do01	
3204.1(10)	5^-,7^-			3	0.14						43(21) fs	77Ch12	100
3207.2(3)	7^-,9^-										56(14) fs		6.97
3262.6(7)	3^-	3	0.80								31(15) fs	69Do01	42(4) 58(4)
3266.9(8)	X^-		incl									69Do01	
3344.2(3)													4.24
3348.3(7)													100
3351.1(6)	3^-–7^-			3	0.44	3	0.07					77Ba14	
3376(15)	9^-–15^-	1	0.03									69Do01	
3447.5(9)	13^-	1	0.07								<70 fs	69Do01	
3578.4(11)	⟨11–15⟩										<70 fs		
3590(15)	9^-–15^-	1	0.03									69Do01	
3719(8)	1^+			0	0.01							77Ch12	
3722.1(8)													9.0

(continued) **$^{51}_{24}$Cr**

E^* [keV]	$2J^\pi$	$2T$	L	C^2S (τ,d)	L	C^2S (d,p)	L	C^2S (τ,α)	E^*_{anal} [keV]	L (p,d)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E^*_f: 0.0 749 777 $2J^\pi_f$: 7^- 3^- 1^-		
3759(10)	9^-–15^-		1	0.08			1	0.02				69Do01			
3766.8(3)	1^-,3^-			incl	1	0.30						69Do01		52(9)	48(9)
3770.5(3)	1^-,3^-										<28 fs			66(9)	30(6)
3816.7(12)	$\langle 19^- \rangle$														
3831.4(2)	$\langle 7$–$11 \rangle^-$		3	1.13							30(8) fs	69Do01	32.00		
3863(8)															
3870.7(10)															
3897(8)															
3900.3(8)	5^+										55(15) fs		93(6)		
3927.5(10)	5^+										<25 fs		28.00		
3933.7(10)	9^-–15^-		1	0.04								69Do01			
3947(10)				incl								69Do01			
3953.2(7)	5^+										31(10) fs		45(4)	24(4)	
3971.2(8)															
3977.4(6)	3^+,5^+				2	0.18					<35 fs	77Ch12		29.9(6)	
3984.8(5)	5^+										22(5) fs		44(8)		
3990(10)	3^+,5^+						2	0.10				78Fo34			
4005.2(8)	5^-,7^-				3	0.17						77Ch12			
4006.6(9)													50		
4017.2(7)	$\langle 3^-$–$7^- \rangle$		1	0.02							21(10) fs	69Do01	x	x	
			+3	0.22								69Do01			
4020(15)	9^-–15^-														
4040.0(3)	1^-				1	0.40						77Ch12		21(7)	60(8)
4071.2(6)	3^+,5^+				2	0.27	2	0.23			<40 fs	77Ch12	x	x	
4099(10)	7^+,9^+				4	0.98						77Ch12			
4106.7(8)													x		
4111.0(6)														x	
4119.1(11)															
4136.7(8)															
4155(3)	7^+,9^+				4	3.2						77Ch12	100		
4161.5(8)															
4174(15)	9^-–15^-		1	0.02								69Do01			
4181.7(10)															
4189.2(10)	3^+,5^+				2	0.12						77Ch12	100		
4198(10)	3^+,5^+						2	0.10				78Fo34			
4214(15)	9^-–15^-		1	0.06								69Do01			
			+3	0.27								69Do01			
4239.2(10)													100		
4254.2(10)													100		
4258(10)	3^+,5^+						2	0.03				78Fo34			
4273(4)													100		
4289.3(5)	1^+,3^+				0	0.01						77Ch12			100
4318(10)															
4336(15)	9^-–15^-		1	0.28								69Do01			
4354.6(11)	$\langle 1^-$,$3^- \rangle$				$\langle 1 \rangle$	0.01						77Ch12			

(continued) **$^{51}_{24}$Cr**

E^* [keV]	$2J^\pi$	$2T$	L	C^2S (τ,d)	L	C^2S (d,p)	L	C^2S (τ,α)	E^*_{anal} [keV]	L (p,d)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E^*_f: 0.0 749 777 $2J^\pi_f$: 7^- 3^- 1^-
4359(10)	$3^+,5^+$						2	0.07				78Fo34	
4405.6(11)													
4426(10)	$1^-,3^-$				1	0.07						77Ch12	
4439(10)	$3^+,5^+$				2	0.10						77Ch12	
4451(15)	9^-–15^-		1	0.03								69Do01	
4495(15)	X^-		3	0.10								69Do01	
4508(10)													
4533(10)													
4552(15)	9^-–15^-		1	0.03								69Do01	
4560.9(6)	$5^-,7^-$				3	0.28						77Ch12	
4569(10)	$\langle 3^+,5^+\rangle$						$\langle 2\rangle$	0.10				78Fo34	
4577(10)	$1^-,3^-$				1	0.03						77Ch12	
4583(10)	$7^-,5^-$						3	0.06				78Fo34	
4609(10)	1^+				0	0.08						77Ch12	
4629(15)													
4637.0(4)	3												70(15)
4647(10)													
4668(10)	$7^-,5^-$				$\langle 1\rangle$	0.02	3	0.12				77Ch12	
4669(10)	$\langle 1^-,3^-\rangle$												
4684(10)	$5^+,3^+$				2	0.05						77Ch12	
4707(15)													
4730(10)													
4742(10)	9^-–15^-		1	0.24								69Do01	
4769.6(4)	$1^-,3^-$				1	0.24						77Ch12	78(23)
4793(10)	$\langle 1^-,3^-\rangle$						$\langle 1\rangle$	0.13				78Fo34	
4823(10)													
4833.6(4)													100
4849(15)	$1^-,3^-$				1	0.02						77Ch12	
4874(15)	$\langle 1^-,3^-\rangle$				$\langle 1\rangle$	0.01						77Ch12	
4916(15)													
4930													
4939(15)	9^-–15^-		1	0.02								69Do01	
4964													
4978(10)	$\langle 3^+,5^+\rangle$						$\langle 2\rangle$	0.08				78Fo34	
4997(15)													
5030(10)	$\langle 3^+$–$7^-\rangle$						$\langle 2,3\rangle$	0.03				78Fo34	
5053(15)	9^-–15^-		1	0.02								69Do01	
5078(15)													
5113(15)	1^+				0	>0.03						77Ch12	
5114(15)	X^-		3	0.23								69Do01	
5121(10)	$5^-,7^-$						3	0.28				78Fo34	
5145(15)	$\langle 5^-,7^-\rangle$				$\langle 3\rangle$	0.14						77Ch12	
5155(15)	9^-–15^-		1	0.03								69Do01	
5177(15)													
5203(15)	9^-–15^-		1	0.04								69Do01	

(continued) **$^{51}_{24}$Cr**

E^* [keV]	$2J^\pi$	$2T$	L	C^2S (τ,d)	L	C^2S (d,p)	L	C^2S (τ,α)	E^*_{anal} [keV]	L (p,d)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E^*_f: 0.0 749 777 $2J^\pi_f$: 7^- 3^- 1^-
5205.2(8)	1^-,3^-				1	0.18						77Ch12	
5222(10)	1^-,3^-						1	0.04				78Fo34	
5230(15)	9^-–15^-		1	0.059								69Do01	
5239.6(11)	1,3												
5249(15)	3^+,5^+				2	0.04						77Ch12	
5265(10)	3^+,5^+						2	0.17				78Fo34	
5270													
5284(15)	3^+,5^+				2	0.03						77Ch12	
5306(10)	$\langle 7^-$–$3^+\rangle$						$\langle 3,2\rangle$	0.1				78Fo34	
5332(15)	3^+,5^+				2	0.08						77Ch12	
5344(15)	9^-–15^-		1	0.03								69Do01	
5346(10)	$\langle 3^+$–$7^-\rangle$						$\langle 2,3\rangle$	0.05				78Fo34	
5357(15)													
5395(15)	1^-,3^-				1	0.023						77Ch12	
5409(10)	3^+,5^+						2	0.04				78Fo34	
5420(15)	X^-		3	0.13								69Do01	
5447	$\langle 1^-$,$3^-\rangle$				$\langle 1\rangle$	0.024						77Ch12	
5449(15)													
5455(10)	5^-,7^-						3	0.40				78Fo34	
5464(15)													
5473(15)													
5495(15)	1^-,3^-				1	0.021						77Ch12	
5532(15)	$\langle 3^+$,$5^+\rangle$				$\langle 2\rangle$	0.022						77Ch12	
5537(10)	3^+,5^+						2	0.10				78Fo34	
5560(15)	9^-–15^-		1	0.28								69Do01	
5563	$\langle 21^-\rangle$												
5580(15)													
5605(15)													
5630(15)	$\langle 1^-$,$3^-\rangle$				$\langle 1\rangle$	0.014						77Ch12	
5656(15)													
5668.2(5)	1^-,3^-				1	0.25						77Ch12	36(1)
5699(15)													
5711	$\langle 23^-\rangle$												
5711(15)													
5725(15)													
5741(15)	1^-,3^-				1	0.12						77Ch12	
5761(10)	3^+,5^+						2	0.15				78Fo34	
5769(15)													
5787(15)													
5812(15)													
5832(10)	5^-,7^-						3	0.14				78Fo34	
5850(15)													
5880(15)													
5928(15)													
5943(10)	$\langle 1,3^-\rangle$						$\langle 0,1\rangle$	0.09				78Fo34	

(continued) **$^{51}_{24}$Cr**

E^* [keV]	$2J^\pi$	$2T$	L	C^2S (τ,d)	L	C^2S (d,p)	L	C^2S (τ,α)	E^*_{anal} [keV]	L (p,d)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E^*_f: 0.0 749 777 $2J^\pi_f$: 7^- 3^- 1^-
5950(15)	1^-,3^-				1	0.058						77Ch12	
5964(15)	9^-–15^-		1	0.15								69Do01	
5970													
5991(15)	1^+				0	0.017						77Ch12	
6034(15)	1^-,3^-				1	0.067						77Ch12	
6075(15)													
6107(15)													
6122(15)	$\langle 1^-,3^-\rangle$				$\langle 1\rangle$	0.032						77Ch12	
6136													
6157(15)													
6162	$21,23^-$												
6184(15)	1^+				0	0.014						77Ch12	
6219(15)													
6236(15)	1^-,3^-				1	0.030						77Ch12	
6254(15)	1^+				0	0.022						77Ch12	
6285													
6306(15)	$\langle 3^+,5^+\rangle$				$\langle 2\rangle$	0.023						77Ch12	
6332(15)	$\langle 1^-,3^-\rangle$				$\langle 1\rangle$	0.043						77Ch12	
6360(15)	1^+				0	0.027						77Ch12	
6378(10)	3^+,5^+						2	0.09				78Fo34	
6413(15)													
6438(15)	1^+				0	0.029						77Ch12	
6478(15)													
6485(15)													
6518(15)													
6523													
6564													
6604(15)	3^+,5^+				2	0.053						77Ch12	
6611(5)	7^-	5					3	1.11	0.0			78Fo34	
6660(15)	$\langle 3^+,5^+\rangle$				$\langle 2\rangle$	0.018						77Ch12	
6680(15)													
6693(15)													
6718(15)													
6723(15)													
6741(15)													
6760(15)													
6775(15)	3^+,5^+				2	0.072						77Ch12	
6803(15)	3^+,5^+				2	0.11						77Ch12	
6820													
6866(15)	3^+,5^+				2	0.036						77Ch12	
6879(15)													
6894	$23,25^-$												
6896(15)	1^-,3^-				1	0.039						77Ch12	
6920(15)													
6979(15)													

(continued)

$^{51}_{24}$Cr

E^* [keV]	$2J^\pi$	$2T$	L	C^2S (τ,d)	L	C^2S (d,p)	L	C^2S (τ,α)	E^*_{anal} [keV]	L (p,d)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E^*_f: 0.0 749 777 $2J^\pi_f$: 7^- 3^- 1^-
6995(15)	$\langle 1^-,3^-\rangle$				$\langle 1\rangle$	0.037						77Ch12	
7018(15)	1^+				0	0.013	0	0.04				77Ch12	
7038(15)	$1^-,3^-$				1	0.046						77Ch12	
7078													
7088													
7130(15)	$5^-,7^-$				3	0.13						77Ch12	
7141(15)													
7167(15)	$\langle 3^+,5^+\rangle$				$\langle 2\rangle$	0.031						77Ch12	
7208.4(7)	$1^-,3^-$				1	0.043						77Ch12	
7240(15)													
7247.9(9)	$\langle 1,3,5^+\rangle$												
7271(15)													
7282(15)													
7302(15)	1^+				0	0.089						77Ch12	
7342(15)	1^+				0	0.057						77Ch12	
7388(15)	$3^+,5^+$				2	0.033						77Ch12	
7426(15)	$3^+,5^+$				2	0.024						77Ch12	
7445(15)													
7479(15)													
7504(15)													
7555(15)	$3^+,5^+$				2	0.085						77Ch12	
7590(15)	1^+				0	0.017						77Ch12	
7628													
7643													
7670(15)	1^+				0	0.029	0	0.05				77Ch12	
7689													
7703													
7721(15)													
7758(15)													
7787(15)	$3^+,5^+$				2	0.042	2	0.14				77Ch12	
7818(15)													
7835(15)													
7856(15)													
7874(15)	$\langle 3^+,5^+\rangle$				$\langle 2\rangle$	0.034						77Ch12	
7901(15)	1^+				0	0.058						77Ch12	
7932(15)	$3^+,5^+$				2	0.044						77Ch12	
7954	1^+				0	0.045						77Ch12	
8003	1^+				0	0.055						77Ch12	
8024													
8047	1^+				0	0.060						77Ch12	
8078	1^+				0	0.061						77Ch12	
8124	$3^+,5^+$				2	0.10						77Ch12	
8420(20)	$\langle 1^+\rangle$						$\langle 0\rangle$	0.03				78Fo34	
8480(20)	1^+						0	0.04				78Fo34	
8485	$25,27^-$												

(continued) **$^{51}_{24}$Cr**

E^*	$2J^\pi$	$2T$	L	C^2S	L	C^2S	L	C^2S	E^*_{anal}	L	$T_{1/2}$ or	Ref.	Branching ratios in percentage			
													E^*_f:	0.0	749	777
[keV]				(τ,d)		(d,p)		(τ,α)	[keV]	(p,d)	Γ_{cm}		$2J^\pi_f$:	7^-	3^-	1^-
9220(20)	1^+	5					0	0.48	2545			78Fo34				
9330(20)	3^+,5^+	5					2	1.17	2675			78Fo34				
				69Do01		77Ch12		78Fo34	77Ch12			Ref.				

Additional data on this isotope can be found in [91Ca30, 72Ma39, 69De17, 64Bo08].
Data for this isotope are considered in vol. LB I/18A.

Energy levels and branching ratios [97Zh09]. Part 2 **$^{51}_{24}$Cr**

E^*	$2J^\pi$					Branching ratios in percentage						
		E^*_f:	1165	1353	1480	1557	1899	2001.9	2255.5	2312.6	2379.5	2385.4
[keV]		$2J^\pi_f$:	9^-	5^-	11^-	7^-	3^-	5^-	15^-	7^-	9^-	13^-
1480.07(16)	11^-		48(1)									
1557.26(13)	7^-			5.1(1)								
2255.5(3)	15^-				100							
2312.6(2)	7^-		86(3)									
2379.5(1)	9^-		14(1)	26(1)	19(2)	13(1)						
2385.4(4)	13^-				100							
2704.4(2)	$\langle 11\rangle^-$		9(1)		14(1)	74(4)						
2767.3(2)	9^-		26(2)		21(2)					2.1		
2828.5(4)	3^-						13(6)	38(5)				
2890.2(4)	3^-			26(3)			11(2)	30(3)			18	
2911.0(4)	3^-–7^-			6(4)		58(7)						
2948.2(6)	5^-,7^-					36(2)	31(2)					
3004.4(3)	3^+							55(3)				
3018.6(6)	11^-		19(3)		6(3)							18.0(30)
3055.9(6)	1^-						22(6)					
3109.2(2)	7^-		25	3				34				
3125.9(2)	3^-							14(2)				
3134.8(4)	$\langle 3^-\rangle$			94								
3180.7(6)	$\langle 17\rangle^-$								100			
3207.2(3)	7^-,9^-		62	19.92		10.96						
3266.9(8)	X^-		14(6)		86(6)							
3344.2(3)						65(6)		29(6)				
3351.1(6)	3^-–7^-			32(6)		35(6)	33(6)					
3447.5(9)	13^-								100			
3578.4(11)	$\langle 11$–$15\rangle$											100
3722.1(8)						91						
3831.4(2)	$\langle 7$–$11\rangle^-$				19.00	45					4.00	
3870.7(10)			100									
3900.3(8)	5^+						7(6)					
3927.5(10)	5^+				33.00							

(continued) **$^{51}_{24}$Cr**

E^*	$2J^\pi$		Branching ratios in percentage									
		E_f^*:	1165	1353	1480	1557	1899	2001.9	2255.5	2312.6	2379.5	2385.4
[keV]		$2J_f^\pi$:	9^-	5^-	11^-	7^-	3^-	5^-	15^-	7^-	9^-	13^-
3933.7(10)	9^-–15^-		100									
3953.2(7)	5^+			31.09								
3977.4(6)	3^+,5^+			52(10)		18(9)						
3984.8(5)	5^+					9(4)		16(6)				
4005.2(8)	5^-,7^-						x	x				
4006.6(9)						50						
4040.0(3)	1^-						13(4)					
4071.2(6)	3^+,5^+					x						
4106.7(8)			62(11)									
4111.0(6)								x				
4119.1(11)								100				
4136.7(8)				85(13)								
4161.5(8)			62(10)			38(10)						
4181.7(10)			100									
4560.9(6)	5^-,7^-			100								
4637.0(4)	3			13(4)								
5205.2(8)	1^-,3^-						100					
7208.4(7)	1^-,3^-							100				

Energy levels and branching ratios [97Zh09]. Part 3 **$^{51}_{24}$Cr**

E^*	$2J^\pi$		Branching ratios in percentage									
		E_f^*:	2762.6	2828.5	2890.2	2908.1	2911.0	3001.7	3125.9	3180.7	3348.3	3766.8
[keV]		$2J_f^\pi$:	1^+	3^-	3^-			5^-	3^-	$\langle 17\rangle^-$		1^-,3^-
3207.2(3)	7^-,9^-						0.40					
3344.2(3)							1.41					
3770.5(3)	1^-,3^-					3(2)						
3816.7(12)	$\langle 19^-\rangle$									100		
3927.5(10)	5^+				39							
3971.2(8)									100			
3984.8(5)	5^+							31(8)				
4040.0(3)	1^-								7(2)			
4106.7(8)								38(11)				
4111.0(6)			x									
4136.7(8)			15(13)									
4354.6(11)	$\langle 1^-,3^-\rangle$		100									
4405.6(11)			100									
4637.0(4)	3			16(4)								
4769.6(4)	1^-,3^-											22(5)
7247.9(9)	$\langle 1,3,5^+\rangle$										62(14)	

Energy levels and branching ratios [97Zh09]. Part 4 **$^{51}_{24}$Cr**

E^*	$2J^\pi$		Branching ratios in percentage					
		E^*_f:	3816.7	3971.2	4560.9	4833.6	5563	5711
[keV]		$2J^\pi_f$:	$\langle 19^- \rangle$		$5^-,7^-$		$\langle 21^- \rangle$	$\langle 23^- \rangle$
5563	$\langle 21^- \rangle$		100					
5668.2(5)	$1^-,3^-$				20.0(6)	44(10)		
5711	$\langle 23^- \rangle$		100					
6162	$21,23^-$		x					
6894	$23,25^-$						100	
7247.9(9)	$\langle 1,3,5^+ \rangle$			38(10)				
8485	$25,27^-$							100

Energy levels and branching ratios [00Hu06]. **$^{52}_{24}$Cr**

E^*	J^π	$2T$	L	S''	σ (τ,d)	L	S''	L	$\beta_L R$	σ (p,p′)	σ (p,α)	σ (t,p)	σ (τ,n)	Ref.
[keV]				(τ,d)	μb/sr		(α,t)		(p,p′)	μb/sr	*rel.*	μb/sr	μb/sr	
0.0	0^+		3	0.50	54	3	0.50				0.1	570	410(30)	92Ba16
1434.09(1)*	2^+		3	0.641	100	3	0.68(10)	2	0.87(4)	3.0	1.0	≈7	54(7)	92Ba16
2369.63(2)	4^+		3	0.490	47	3	0.53(10)	4	0.33	1.1	1.5			78Wa04
2646.9(10)	0^+							0	0.095	0.5	0.1	570		85Fu10
2767.76(2)	4^+		3	0.692	79	3	0.81(10)	4	0.30	1.1	1.4			68Ma37
2964.78(2)	2^+							2	0.08	1.3	1.0	≈6		85Fu10
3113.86(2)	6^+		3	1.810	180	3	1.72(20)	6	0.35(10)	0.4	0.9			92Ba16
3161.74(6)*	2^+							2	0.27	1.6	0.8	=117		85Fu10
3415.31(3)	4^+		3	0.101				4	0.13	0.9	1.0			78Wa04
3472.24(14)	3^+							2+3	0.13(2)	1.4	1.0			85Fu10
3615.92(2)	5^+		1	0.020						0.5	1.2			78Wa04
3739.6*	$1–2^+$													
3771.7(1)*	2^+		1	0.054	74	3	0.05(5)	2	0.28	1.5	0.7	≈15	30(7)	92Ba16
3951.2(10)	2^+		1	0.013	9					0.6	0.9	≈4		78Wa04
4015.50(3)	5^+		1	0.014						0.3	0.9			78Wa04
4039.2(6)	4^+		1	0.008	10			4	0.16	0.7	1.1			92Ba16
4100(100)	$\langle 3 \rangle^-$													
4470	$\langle 3 \rangle^-$													
4563.0(8)	3^-		1	0.008	16			3	0.61	1.2	0.8	≈11		92Ba16
4611	$\langle 3,4 \rangle^+$													
4627.4(2)	4^+		1	0.060	98			4	0.36	0.9	1.4			92Ba16
4702(5)	2^+		1	0.090	236					1.4	0.6		70(10)	92Ba16
4730	4^+													
4740	2^+		1	0.104	123			2	0.22(2)	1.3	1.2	160		69Pe02
4750.3(2)	$\langle 8 \rangle^+$													
4800.1*	$1–2^+$													
4805.9(2)	$\langle 6^+ \rangle$									0.4	0.7			67Ka11
4815.69(9)	$1^+,2^+$										incl			
4841.3*	$1^+,2^+$		1	0.040	37					0.9	1.0			92Ba16

(continued) **$^{52}_{24}$Cr**

E^* [keV]	J^π	$2T$	L	S'' (τ,d)	σ (τ,d) μb/sr	L	S'' (α,t)	L	$\beta_L R$ (p,p′)	σ (p,p′) μb/sr	σ (p,α) *rel.*	σ (t,p) μb/sr	σ (τ,n) μb/sr	Ref.
4951(4)	4^+							4	0.20(5)	0.8	0.5			69Pe02
5054(1)	4^+													
5098.4*	2^+		1	0.39	772			4	0.15	1.2	1.4			92Ba16
5139(5)	$\langle 6^+ \rangle$		$\langle 3 \rangle$	0.052						0.2	0.8			78Wa04
5211(4)										0.5	0.3			67Ka11
5285(5)	$\langle 4 \rangle^-$		0	0.007	602					0.3	0.7			92Ba16
5346(4)	4^+,6^+									0.5	0.7			67Ka11
5396.8(3)	$\langle 7^+ \rangle$													
5410(4)	$\langle 2^+ \rangle$									1.4	1.3			67Ka11
5425(5)	$\langle 4 \rangle^+$		1	0.195				4	0.32	0.4	0.4	≈97		78Wa04
5432(6)	$[2^+]$			0.13	278					0.8	1.3			67Ka11
5446.4(5)	4^+		1	0.14	186					1.0	0.6	≈14		78Wa04
5490.8*	1–2^+									0.8	0.7			67Ka11
5500	3^-													
5541(5)	4^+							4	0.074	1.1	0.4			85Fu10
5544.4*	$1^{\langle + \rangle}$									0.8	0.4			67Ka11
5563.5(8)	X^+									1.3	1.1			67Ka11
5584(6)	X^+		1	0.12	257					0.5	0.1			92Ba16
5600(15)	0^+											≈43	133(15)	75Bo14
5664.4(11)	$\langle 2 \rangle^+$		1	0.003				2	0.095	0.9	0.5			78Wa04
			+3	0.026										78Wa04
5725.1(12)	X^+		1	0.061						0.7	1.1			78Wa04
5737(10)	$\langle 4^+ \rangle$							4	0.25(8)					69Pe02
5755(15)	2^+–5^+		1	0.040	88							≈82		92Ba16
5796.0*	1^+,2^+		1	0.050						0.4	0.5			78Wa04
			+3	0.124										78Wa04
5811(5)	5–6^+													
5818(6)								3	0.24(6)	0.5				69Pe02
5824.7(4)	$\langle 8^+ \rangle$		1	0.054	116									92Ba16
5830	2^+–5^+			incl	incl									92Ba16
5860.4(11)										1.0				67Ka11
5865(6)										1.0		≈8		67Ka11
5873(5)	3^-							3	0.082	1.1				85Fu10
5891	3^-,4^-		0	0.005	210									92Ba16
5916(6)										0.6				67Ka11
5919(5)	$\langle 5$–$6^+ \rangle$									0.6				90Fi07
5953(5)	$\langle 2 \rangle^+$		1	0.008	30					0.7				92Ba16
5960(5)										1.0		≈49		67Ka11
5996(5)	$\langle 3 \rangle^-$		[1]	0.026	47			3	0.087	0.4	0.7			92Ba16
6026(6)	X^+		1	0.048	32							≈22		92Ba16
6035.1(12)														
6055(5)	$\langle 2 \rangle^+$							2	0.13					85Fu10
6065(7)												≈12		
6106(6)	0^+				30									
6136.7*	$\langle 2 \rangle^+$							2	0.07					85Fu10

(continued) **$^{52}_{24}$Cr**

E^* [keV]	J^π	$2T$	L	S'' (τ,d)	σ (τ,d) μb/sr	L	S'' (α,t)	L	$\beta_L R$ (p,p′)	σ (p,p′) μb/sr	σ (p,α) *rel.*	σ (t,p) μb/sr	σ (τ,n) μb/sr	Ref.
6153(8)	2^+											≈44	38(4)	75Bo14
6164(12)	3^-													
6175(7)	$\langle 2\rangle^+$							2	0.21(3)	0.8				69Pe02
6193(6)	X^+		1	0.040	60					0.8				92Ba16
6205.1(12)														
6210(10)														
6220(6)														
6233(10)	X^+		1	0.12	231					0.5				92Ba16
6243(5)	$\langle 3\rangle^-$							3	0.074					85Fu10
6252(6)										0.3				67Ka11
6272(6)										0.3				67Ka11
6282(10)										0.3				67Ka11
6293(7)										0.3				67Ka11
6324(10)														
6349(5)	X^+													
6365.3(11)	$\geq 8^+$		1	0.074	135									92Ba16
6375.1(12)														
6389.5(11)	X^+		1	0.074	128									92Ba16
6392(10)	$\langle 3^-\rangle$													
6426(5)														
6437(10)														
6452.4	$\langle 9^+\rangle$													
6453.4(5)	$\langle 9^+\rangle$													
6459.6*	$1–2^+$													
6482(5)	$\langle 5,6\rangle$													
6493.8*	2^+		1	0.020	51			2	0.21(5)					92Ba16
6541(10)														
6568(10)														
6580(5)	3^-							3	0.34					85Fu10
6637(5)					91									
6678(5)	0^+		1	0.012	25								47(7)	92Ba16
6700(20)	X^-													
6704(5)	$\langle 6\rangle^+$		1	0.009										78Wa04
			+3	0.020										78Wa04
6760	X^+		1	0.004										78Wa04
			+3	0.022										78Wa04
6795.2(12)	3^-							3	0.26					85Fu10
6800	X^+													
6810(30)	2^+		1	0.031	112			2	0.22(3)					92Ba16
6871(5)	$\langle 5\rangle^-$							5	0.16					85Fu10
6894	X^+		1	0.051	79									92Ba16
6928	X^+		1	0.10	280									92Ba16
6956(5)	$\langle 5–6^+\rangle$													
6993(5)	$\langle 3\rangle^-$		1	0.085	222			3	0.18					92Ba16
7030(10)	$1^{\langle +\rangle}$													

(continued) $^{52}_{24}$Cr

E^* [keV]	J^π	$2T$	L	S'' (τ,d)	σ (τ,d) μb/sr	L	S'' (α,t)	L	$\beta_L R$ (p,p′)	σ (p,p′) μb/sr	σ (p,α) *rel.*	σ (t,p) μb/sr	σ (τ,n) μb/sr	Ref.
7080(10)	X^+		1	0.13	368			3	0.34					92Ba16
7100	3^-													
7140(7)	X^+							4	0.14					85Fu10
7170(10)	X^+		1	0.085	205									92Ba16
7217(10)	2^+		1	0.023				2	0.10					78Wa04
			+3	0.057										78Wa04
7223	X^+		1	0.036	68									92Ba16
7237.9(7)	$\langle 10\rangle$													
7260(10)	X^+		1	0.034										78Wa04
			+3	0.150				4	0.13					78Wa04
7278(10)	$\langle 4\rangle^+$		1	0.067	175									92Ba16
7310	X^+		1	0.077										78Wa04
			+3	0.117										78Wa04
7322	X^+		1	0.096	221									92Ba16
7342(7)	1^+		1	0.038				2	0.074					78Wa04
			+3	0.073										78Wa04
7359	X^+		1	0.060	130									92Ba16
7376(10)	$\langle 5\rangle^-$							5	0.11					85Fu10
7395(10)	X^+		1	0.30	623									92Ba16
7409(10)	$\langle 3\rangle^-$							3	0.091					85Fu10
7450(50)	0^+												39(7)	75Bo14
7450(50)	2^+												22(7)	75Bo14
7458(10)														85Fu10
7482(10)	$\langle 3\rangle^-$							3	0.13					85Fu10
7487	X^+		1	0.071	86									92Ba16
7524(3)	1^+		1	0.025	133			0		70				92Ba16
7560(20)	X^+													
7585(10)	$\langle 3\rangle^-$							3	0.074					85Fu10
7590	X^+		1	0.072										78Wa04
			+3	0.110	271									78Wa04
7679(10)	$\langle 6\rangle^+$		1	0.016	89									92Ba16
			+3	0.25										92Ba16
7700(10)	1^+													
7730(2)	1^-													
7738(10)	$\langle 3\rangle^-$							3	0.26					85Fu10
7750	X^+		[1]	0.047	144									92Ba16
7760	X^+		1	0.046	145									92Ba16
7810	X^-					4	0.88							89Pe06
7820(10)	1^+		1	0.068	284									92Ba16
7823(10)	$\langle 3\rangle^-$							3	0.12					85Fu10
7854(7)	X^+		1	0.073	212			4	0.11					92Ba16
7893(10)	4^+							4	0.12					85Fu10
7896(2)	1^-													
7900	3^-													
7920	X^+		1	0.086	217									92Ba16

(continued) **$^{52}_{24}$Cr**

E^* [keV]	J^π	$2T$	L	S'' (τ,d)	σ (τ,d) μb/sr	L	S'' (α,t)	L	$\beta_L R$ (p,p′)	σ (p,p′) μb/sr	σ (p,α) *rel.*	σ (t,p) μb/sr	σ (τ,n) μb/sr	Ref.
7930(50)	X^+		1	0.060										78Wa04
7967(10)	$\langle 3\rangle^-$		1	0.043	161			3	0.095					92Ba16
8010	X^+					4	0.48							89Pe06
8022(10)	2^+		1	0.068	387			2	0.19					92Ba16
8083	X^+		1	0.047	187									92Ba16
8087(9)	$\langle 3\rangle^-$							3	0.091					85Fu10
8100(20)	8^-													
8121(10)	X^+		1	0.020										78Wa04
			+3	0.056										78Wa04
8181(10)			1	0.144	485			3	0.15					92Ba16
8190	X^-					4	0.69							89Pe06
8213(10)	$\langle 1^+\rangle$													
8216.5(9)	$\langle 11\rangle$													
8234			1	0.106	324									92Ba16
8250	X^+		1	0.048										78Wa04
			+3	0.092										78Wa04
8281(10)	$\langle 3\rangle^-$													
8283	X^+		1	0.080	312									92Ba16
8337(10)	$\langle 4^+\rangle$		1	0.034										78Wa04
			+3	0.068										78Wa04
8350	X^+		1	0.030										78Wa04
8374(10)	$\langle 3\rangle^-$				180			3	0.06					85Fu10
8390(10)	X^+		1	0.041										78Wa04
8412(10)	X^+							0						85Fu10
8420	6^-					4	0.015							89Pe06
8451	X^+		1	0.106	226									92Ba16
8457(10)	$\langle 3\rangle^-$							3	0.13					85Fu10
8505(10)	3^-							3	0.10					85Fu10
8569(10)	$\langle 1^+\rangle$		1	0.038	131			0						92Ba16
8600(10)	3^-													
8617(10)			1	0.021	145									92Ba16
			+3	0.29	incl									92Ba16
8679(10)	$\langle 3\rangle^-$							3	0.10					85Fu10
8710(50)	0^+												96(5)	75Bo14
8710(50)	2^+												17(5)	75Bo14
8728(10)	$\langle 3\rangle^-$							3	0.10					85Fu10
8778(10)	$\langle 3\rangle^-$							3	0.13					85Fu10
8790(10)	2													
8827(10)														
8860(10)	1,2													
8890(20)	1,2													
8940(20)	8^-,6^-													
9004(9)	1^+									60				83Dj05
9050(10)	1,2													
9080(20)	$\langle 8^-\rangle$													

(continued) **$^{52}_{24}$Cr**

E^* [keV]	J^π	$2T$	L	S'' (τ,d)	σ (τ,d) μb/sr	L	S'' (α,t)	L	$\beta_L R$ (p,p′)	σ (p,p′) μb/sr	σ (p,α) *rel.*	σ (t,p) μb/sr	σ (τ,n) μb/sr	Ref.
9142.7(6)	1^+									420				83Dj05
9200	5^-													90Fi07
9214(2)	1^+									370				83Dj05
9245(10)	1^+													
9320(9)	1^+									100				83Dj05
9370(20)	1,2													
9420(10)	1^+									310				83Dj05
9440(7)	$\langle 3\rangle^-$								0.095					83Dj05
9450(20)	8^-					4	0.032							89Pe06
9470(20)	X^+													
9580(10)	0^+												67(7)	75Bo14
9612(9)	1^+									170				83Dj05
9660(20)	8^-					4	0.012							89Pe06
9724(9)	1^+									340				83Dj05
9787(3)	1^-													
9830(10)	1^+													
9878(9)	1^+									190				83Dj05
9910(20)	8^-													
9981(3)	$X^{\langle -\rangle}$													
10008(9)	1^+									110				83Dj05
10110(20)	$\langle 8^-\rangle$					4	0.019							89Pe06
10130(20)	1,2													
10180(10)	2^-													
10240(20)	1													
10270(20)	1,2													
10300(20)														
10330(20)	6^-					4	0.039							89Pe06
10340(20)	1													
10380(14)	1^+									240				83Dj05
10433(4)	1^+													
10464(9)	1^+									370				83Dj05
10500(20)	1													
10510(20)	$X^{\langle -\rangle}$													
10604(12)	1^+													
10710(10)	1^+													
10760(10)	6^+,8^+													90Fi07
10790(9)	1^+									240				83Dj05
10800(20)	$X^{\langle -\rangle}$													
10820(10)	1,$\langle 2\rangle$													
10927(3)	1,2													
10970(20)	1^+									160				83Dj05
11000(20)	8^-													
11070(10)	1													
11140(10)	1^+									60				83Dj05
11160(20)	$\langle 1^+\rangle$,2													

(continued) $^{52}_{24}$Cr

E^* [keV]	J^π	$2T$	L	S'' (τ,d)	σ (τ,d) μb/sr	L	S'' (α,t)	L	$\beta_L R$ (p,p′)	σ (p,p′) μb/sr	σ (p,α) *rel.*	σ (t,p) μb/sr	σ (τ,n) μb/sr	Ref.
11170(20)	8^-					4	0.047							89Pe06
11229(3)														
11256(2)														
11262(2)	3^+													
11270(20)	8^-													
11273(2)	$\langle 5^+ \rangle$												[86(7)]	75Bo14
11289(3)														90Fi07
11330(20)	$\langle 1 \rangle$,2													
11370(20)	8^-					4	0.051							89Pe06
11399(3)	4^+													
11402(9)	1^+									270				83Dj05
11510(10)	2^-													
11550(20)	8^-													
11570(20)	$\langle 1 \rangle$,2													
11610(10)	2													
11656(3)	1,2													
11660(20)	8^-					4	0.012							89Pe06
11691(3)	2^+													
11713(3)														
11725(3)														
11745(3)														
11765(3)														
11770(20)	8^-					4	0.038							89Pe06
11780(20)	$\langle 1 \rangle$,2													
11837(3)														
11880(20)	8^-													
11960(20)	8^-													
12033(6)	$\langle 8 \rangle^-$					4	0.045							89Pe06
12039(5)	3^+													
12101(5)	4^+													
12130(20)	8^-,6^-													
12240(20)	6^-													
12260	6^+,8^+													90Fi07
12500	X^-					4	0.67							89Pe06
12560(20)	1^+									140				83Dj05
12665(6)	3^+													
12730(20)	8^-					4	0.011							89Pe06
12734(6)	$\langle 7^+ \rangle$													
12793(6)	4^+													
12900(20)	1^+									110				83Dj05
12977(6)	X^-					4	0.36							89Pe06
12994(6)	X^+													
13038(6)	X^+													
13220(20)	8^-													
13319														

(continued) **$^{52}_{24}$Cr**

E^* [keV]	J^π	$2T$	L	S'' (τ,d)	σ (τ,d) μb/sr	L	S'' (α,t)	L	$\beta_L R$ (p,p′)	σ (p,p′) μb/sr	σ (p,α) *rel.*	σ (t,p) μb/sr	σ (τ,n) μb/sr	Ref.
13393	6^-													
13419	0^+												230(20)	75Bo14
13570(20)	6^-													
13580(20)	$\langle 1,2\rangle^-$													
13630(10)	0^+												220(20)	75Bo14
13710(20)	6^-													
13950(50)	$[0^+]$												x	75Bo14
14030(20)	6^+													
14110(20)	2^+												102(15)	75Bo14
14340(20)	6^+													
14430(20)	8^-					4	0.020							89Pe06
15270(20)	6^-	3				4	0.080							89Pe06
15482(7)	8^-	3				4	0.121							89Pe06
16400(20)	6^-													
16690(20)	$\langle 8^-\rangle$													
							68Ma37							Ref.
				92Ba16	92Ba16		89Pe06		89Fu07	83Dj05		68Ch20	75Bo14	Ref.
					78Wa04						67Ka11			Ref.

Additional data on this isotope can be found in [00Is11, 00Er01, 92Ba16, 89Fu07, 85Fu10 81Bi04, 78Le08, 69Pe02, 68Gr18].

Abundance: 83.789(18) %.

* Levels observed in (γ,γ') reaction; $B(M1)$, $B(E1)$ and $B(E2)$ can be found in [98En05].

In first two columns parameters of proton transfer reaction are given: C^2S were mainly from [92Ba16] and cross section σ (τ,d) are from the same work;

Given in Supplement parameter N=$(d\sigma/d\Omega$ (exp))/$(d\sigma/d\Omega$ (DWBA)) in [90Fi07] has a meaning of spectroscopic factor in the case of two-neutron transfer reaction (α,^{2}He).

Results of measurements of two-proton transfer reaction (τ,n) at 0° and 20° were compared in [75Bo14] with results of measurements of two-neutron transfer reaction (t,p) [68Ch20, 71Ca19].

For the (τ,n) reaction experimental cross sections σ (τ,n)=$d\sigma/d\Omega_{exp}$ at 0°, calculated $d\sigma/d\Omega_{DWBA}$ and their ratio R=$d\sigma/d\omega_{exp}/d\sigma/d\omega_{DWBA}$ can be found also in [75Al05].

Intensity of protons from the (p,p′) reaction [67Ka11] are given for E^* up to 6.3 MeV and cross sections σ (p,p′) [83Dj05] are given for states with E^*>7.0 MeV.

σ (p,α) from [67Ka11] is intensity relative to the average of 9 levels with E^*=2.77–3.95 MeV.

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

Energy levels and branching ratios [00Hu06]. Part 2 **$^{52}_{24}$Cr**

E^* [keV]	J^π	N (α,^{2}He)	S_N (d,t)	S_N (p,d)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: J_f^π:	0.0 0^+	1434 2^+	2370 4^+	2647 0^+	2768 4^+	2965 2^+
0.0	0^+	740(540)	0.39	0.51	Stable	92Ba16							
1434.09(1)*	2^+		0.15+0.1	0.2	0.71(3) ps	92Ba16		100					

(continued) **$^{52}_{24}$Cr**

E^*	J^π	N	S_N	S_N	$T_{1/2}$ or	Ref.	Branching ratios in percentage					
							E_f^*: 0.0	1434	2370	2647	2768	2965
[keV]		(α,^{2}He)	(d,t)	(p,d)	Γ_{cm}		J_f^π: 0^+	2^+	4^+	0^+	4^+	2^+
2369.63(2)	4^+		0.1	0.07	1.04(+35-17) ps	78Wa04		100				
2646.9(10)	0^+		0.01	0.02		85Fu10		100				
2767.76(2)	4^+	200(150)	0.12	0.10	1.9(5) ps	68Ma37		98(1)	1.7(1)			
2964.78(2)	2^+				0.42(8) ps	85Fu10	0.9(6)	99(4)				
3113.86(2)	6^+	55(15)			41.4(14) ps	92Ba16			98.9(4)		1.08(1)	
3161.74(6)*	2^+				0.066(14) ps	85Fu10	9(1)	91(5)				
3415.31(3)	4^+				0.26(7) ps	78Wa04		6.8(6)	14(4)	x	80(4)	
3472.24(14)	3^+		1.45	2.3	7.2(8) ps	85Fu10		22(2)			78(24)	
3615.92(2)	5^+				2.6(12) ps	78Wa04			53.9(8)		42.5(4)	
3739.6*	1–2^+											
3771.7(1)*	2^+		0.31	0.36	10.9(13) fs	92Ba16	21(5)	79(11)				
3951.2(10)	2^+				33(6) fs	78Wa04	100		x			
4015.50(3)	5^+				0.61(+27-19) ps	78Wa04			4.5(3)		36(4)	
4039.2(6)	4^+		0.79	1.14	26(4) fs	92Ba16						
4100(100)	$\langle 3\rangle^-$											
4470	$\langle 3\rangle^-$											
4563.0(8)	3^-				40(6) fs	92Ba16		x				
4611	$\langle 3,4\rangle^+$											
4627.4(2)	4^+					92Ba16			100			
4702(5)	2^+					92Ba16						
4730	4^+											
4740	2^+					69Pe02						
4750.3(2)	$\langle 8\rangle^+$				0.64(+20-17) ps							
4800.1*	1–2^+											
4805.9(2)	$\langle 6^+\rangle$	25(13)			0.49(+28-14) ps	67Ka11						
4815.69(9)	1^+,2^+						50(8)	50(10)				
4841.3*	1^+,2^+					92Ba16						
4951(4)	4^+					69Pe02						
5054(1)	4^+											
5098.4*	2^+					92Ba16						
5139(5)	$\langle 6^+\rangle$					78Wa04						
5211(4)						67Ka11						
5285(5)	$\langle 4\rangle^-$					92Ba16						
5346(4)	4^+,6^+	≈60				67Ka11						
5396.8(3)	$\langle 7^+\rangle$				0.14(+12-9) ps							
5410(4)	$\langle 2^+\rangle$					67Ka11						
5425(5)	$\langle 4\rangle^+$					78Wa04						
5432(6)	$[2^+]$					67Ka11						
5446.4(5)	4^+					78Wa04						
5490.8*	1–2^+					67Ka11						
5500	3^-											
5541(5)	4^+					85Fu10						
5544.4*	$1^{\langle+\rangle}$					67Ka11						
5563.5(8)	X^+					67Ka11						
5584(6)	X^+					92Ba16						

(continued) **$^{52}_{24}$Cr**

E^* [keV]	J^π	N (α,^{2}He)	S_N (d,t)	S_N (p,d)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: 0.0 1434 2370 2647 2768 2965 J_f^π: 0^+ 2^+ 4^+ 0^+ 4^+ 2^+
5600(15)	0^+					75Bo14	
5664.4(11)	$\langle 2\rangle^+$					78Wa04	
						78Wa04	
5725.1(12)	X^+					78Wa04	
5737(10)	$\langle 4^+\rangle$					69Pe02	
5755(15)	2^+–5^+					92Ba16	
5796.0*	1^+,2^+					78Wa04	
						78Wa04	
5811(5)	5–6^+						
5818(6)						69Pe02	
5824.7(4)	$\langle 8^+\rangle$				1.0(+6-4) ps	92Ba16	
5830	2^+–5^+					92Ba16	
5860.4(11)						67Ka11	
5865(6)						67Ka11	
5873(5)	3^-					85Fu10	
5891	3^-,4^-					92Ba16	
5916(6)						67Ka11	
5919(5)	$\langle 5$–$6^+\rangle$	≈75				90Fi07	
5953(5)	$\langle 2\rangle^+$					92Ba16	
5960(5)						67Ka11	
5996(5)	$\langle 3\rangle^-$					92Ba16	
6026(6)	X^+					92Ba16	
6035.1(12)							
6055(5)	$\langle 2\rangle^+$					85Fu10	
6065(7)							
6106(6)	0^+						
6136.7*	$\langle 2\rangle^+$					85Fu10	
6153(8)	2^+					75Bo14	
6164(12)	3^-						
6175(7)	$\langle 2\rangle^+$					69Pe02	
6193(6)	X^+					92Ba16	
6205.1(12)							
6210(10)							
6220(6)							
6233(10)	X^+					92Ba16	
6243(5)	$\langle 3\rangle^-$					85Fu10	
6252(6)						67Ka11	
6272(6)						67Ka11	
6282(10)						67Ka11	
6293(7)						67Ka11	
6324(10)							
6349(5)	X^+						
6365.3(11)	$\geq 8^+$					92Ba16	
6375.1(12)							
6389.5(11)	X^+					92Ba16	

(continued) $^{52}_{24}$Cr

E^* [keV]	J^π	N (α,^{2}He)	S_N (d,t)	S_N (p,d)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage E_f^*: 0.0 1434 2370 2647 2768 2965 J_f^π: 0^+ 2^+ 4^+ 0^+ 4^+ 2^+
6392(10)	$\langle 3^- \rangle$						
6426(5)							
6437(10)							
6452.4	$\langle 9^+ \rangle$				0.14(+9-8) ps		
6453.4(5)	$\langle 9^+ \rangle$				<1.4 ps		
6459.6*	$1–2^+$						
6482(5)	$\langle 5,6 \rangle$						
6493.8*	2^+				0.678(13) ps	92Ba16	
6541(10)							
6568(10)							
6580(5)	3^-					85Fu10	
6637(5)							
6678(5)	0^+					92Ba16	
6700(20)	X^-						
6704(5)	$\langle 6 \rangle^+$					78Wa04	
						78Wa04	
6760	X^+					78Wa04	
						78Wa04	
6795.2(12)	3^-					85Fu10	
6800	X^+						
6810(30)	2^+					92Ba16	
6871(5)	$\langle 5 \rangle^-$	190(50)				85Fu10	
6894	X^+					92Ba16	
6928	X^+					92Ba16	
6956(5)	$\langle 5–6^+ \rangle$						
6993(5)	$\langle 3 \rangle^-$					92Ba16	
7030(10)	$1^{\langle + \rangle}$						
7080(10)	X^+					92Ba16	
7100	3^-						
7140(7)	X^+					85Fu10	
7170(10)	X^+					92Ba16	
7217(10)	2^+					78Wa04	
						78Wa04	
7223	X^+					92Ba16	
7237.9(7)	$\langle 10 \rangle$				0.16(+15-8) ps		
7260(10)	X^+					78Wa04	
						78Wa04	
7278(10)	$\langle 4 \rangle^+$					92Ba16	
7310	X^+					78Wa04	
						78Wa04	
7322	X^+					92Ba16	
7342(7)	1^+					78Wa04	
						78Wa04	
7359	X^+					92Ba16	
7376(10)	$\langle 5 \rangle^-$	120(30)				85Fu10	

(continued) **$^{52}_{24}$Cr**

E^* [keV]	J^π	N (α,^{2}He)	S_N (d,t)	S_N (p,d)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage					
							E_f^*:	0.0	1434	2370	2647	2768	2965
							J_f^π:	0^+	2^+	4^+	0^+	4^+	2^+
7395(10)	X^+					92Ba16							
7409(10)	$\langle 3\rangle^-$					85Fu10							
7450(50)	0^+					75Bo14							
7450(50)	2^+					75Bo14							
7458(10)						85Fu10							
7482(10)	$\langle 3\rangle^-$					85Fu10							
7487	X^+					92Ba16							
7524(3)	1^+				0.47(11) fs	92Ba16							
7560(20)	X^+												
7585(10)	$\langle 3\rangle^-$					85Fu10							
7590	X^+					78Wa04							
						78Wa04							
7679(10)	$\langle 6\rangle^+$					92Ba16							
						92Ba16							
7700(10)	1^+												
7730(2)	1^-												
7738(10)	$\langle 3\rangle^-$					85Fu10							
7750	X^+					92Ba16							
7760	X^+					92Ba16							
7810	X^-					89Pe06							
7820(10)	1^+					92Ba16							
7823(10)	$\langle 3\rangle^-$					85Fu10							
7854(7)	X^+					92Ba16							
7893(10)	4^+					85Fu10							
7896(2)	1^-												
7900	3^-												
7920	X^+					92Ba16							
7930(50)	X^+					78Wa04							
7967(10)	$\langle 3\rangle^-$					92Ba16							
8010	X^+					89Pe06							
8022(10)	2^+					92Ba16							
8083	X^+					92Ba16							
8087(9)	$\langle 3\rangle^-$					85Fu10							
8100(20)	8^-												
8121(10)	X^+					78Wa04							
						78Wa04							
8181(10)						92Ba16							
8190	X^-					89Pe06							
8213(10)	$\langle 1^+\rangle$												
8216.5(9)	$\langle 11\rangle$				0.24(+17-9) ps								
8234						92Ba16							
8250	X^+					78Wa04							
						78Wa04							
8281(10)	$\langle 3\rangle^-$												
8283	X^+					92Ba16							

(continued) **$^{52}_{24}$Cr**

E^* [keV]	J^π	N (α,^{2}He)	S_N (d,t)	S_N (p,d)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage					
							E_f^*:	0.0	1434	2370	2647	2768	2965
							J_f^π:	0^+	2^+	4^+	0^+	4^+	2^+
8337(10)	$\langle 4^+ \rangle$					78Wa04							
						78Wa04							
8350	X^+					78Wa04							
8374(10)	$\langle 3 \rangle^-$					85Fu10							
8390(10)	X^+					78Wa04							
8412(10)	X^+					85Fu10							
8420	6^-					89Pe06							
8451	X^+					92Ba16							
8457(10)	$\langle 3 \rangle^-$					85Fu10							
8505(10)	3^-					85Fu10							
8569(10)	$\langle 1^+ \rangle$					92Ba16							
8600(10)	3^-												
8617(10)						92Ba16							
						92Ba16							
8679(10)	$\langle 3 \rangle^-$					85Fu10							
8710(50)	0^+					75Bo14							
8710(50)	2^+					75Bo14							
8728(10)	$\langle 3 \rangle^-$					85Fu10							
8778(10)	$\langle 3 \rangle^-$					85Fu10							
8790(10)	2												
8827(10)													
8860(10)	1,2												
8890(20)	1,2												
8940(20)	8^-,6^-												
9004(9)	1^+					83Dj05							
9050(10)	1,2												
9080(20)	$\langle 8^- \rangle$												
9142.7(6)	1^+					83Dj05							
9200	5^-	90(15)				90Fi07							
9214(2)	1^+					83Dj05							
9245(10)	1^+												
9320(9)	1^+					83Dj05							
9370(20)	1,2												
9420(10)	1^+					83Dj05							
9440(7)	$\langle 3 \rangle^-$					83Dj05							
9450(20)	8^-					89Pe06							
9470(20)	X^+												
9580(10)	0^+					75Bo14							
9612(9)	1^+					83Dj05							
9660(20)	8^-					89Pe06							
9724(9)	1^+					83Dj05							
9787(3)	1^-												
9830(10)	1^+												
9878(9)	1^+					83Dj05							
9910(20)	8^-												

(continued) **$^{52}_{24}$Cr**

E^* [keV]	J^π	N (α,^{2}He)	S_N (d,t)	S_N (p,d)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage					
							E_f^*:	0.0	1434	2370	2647	2768	2965
							J_f^π:	0^+	2^+	4^+	0^+	4^+	2^+
9981(3)	$X^{\langle-\rangle}$												
10008(9)	1^+					83Dj05							
10110(20)	$\langle 8^-\rangle$					89Pe06							
10130(20)	1,2												
10180(10)	2^-												
10240(20)	1												
10270(20)	1,2												
10300(20)													
10330(20)	6^-					89Pe06							
10340(20)	1												
10380(14)	1^+					83Dj05							
10433(4)	1^+												
10464(9)	1^+					83Dj05							
10500(20)	1												
10510(20)	$X^{\langle-\rangle}$												
10604(12)	1^+												
10710(10)	1^+												
10760(10)	6^+,8^+	≈130				90Fi07							
10790(9)	1^+					83Dj05							
10800(20)	$X^{\langle-\rangle}$												
10820(10)	1,$\langle 2\rangle$												
10927(3)	1,2												
10970(20)	1^+					83Dj05							
11000(20)	8^-												
11070(10)	1												
11140(10)	1^+					83Dj05							
11160(20)	$\langle 1^+\rangle$,2												
11170(20)	8^-					89Pe06							
11229(3)													
11256(2)												46	54
11262(2)	3^+								16(2)	48(8)		5(3)	<2
11270(20)	8^-												
11273(2)	$\langle 5^+\rangle$					75Bo14				14(2)			
11289(3)		≈140				90Fi07			100				
11330(20)	$\langle 1\rangle$,2												
11370(20)	8^-					89Pe06							
11399(3)	4^+									41(2)			
11402(9)	1^+					83Dj05							
11510(10)	2^-												
11550(20)	8^-												
11570(20)	$\langle 1\rangle$,2												
11610(10)	2												
11656(3)	1,2												
11660(20)	8^-					89Pe06							
11691(3)	2^+								27(2)	7(1)		3(1)	7(2)

(continued) **$^{52}_{24}$Cr**

E^*	J^π	N	S_N	S_N	$T_{1/2}$ or	Ref.	Branching ratios in percentage					
							E_f^*:	0.0	1434	2370	2647	2768	2965
[keV]		(α,^{2}He)	(d,t)	(p,d)	Γ_{cm}		J_f^π:	0^+	2^+	4^+	0^+	4^+	2^+
11713(3)													
11725(3)													
11745(3)													
11765(3)													
11770(20)	8^-					89Pe06							
11780(20)	$\langle 1\rangle$,2												
11837(3)													
11880(20)	8^-												
11960(20)	8^-												
12033(6)	$\langle 8\rangle^-$					89Pe06			11(1)	18(1)		17(1)	4(2)
12039(5)	3^+								14(1)	26(1)		8(1)	2(1)
12101(5)	4^+									22(2)		8(1)	
12130(20)	8^-,6^-												
12240(20)	6^-												
12260	6^+,8^+	≈160				90Fi07							
12500	X^-					89Pe06							
12560(20)	1^+					83Dj05							
12665(6)	3^+												
12730(20)	8^-					89Pe06							
12734(6)	$\langle 7^+\rangle$												
12793(6)	4^+									55			
12900(20)	1^+					83Dj05							
12977(6)	X^-					89Pe06							
12994(6)	X^+												
13038(6)	X^+												
13220(20)	8^-												
13319													
13393	6^-												
13419	0^+					75Bo14							
13570(20)	6^-												
13580(20)	$\langle 1,2\rangle^-$												
13630(10)	0^+					75Bo14							
13710(20)	6^-												
13950(50)	$[0^+]$					75Bo14							
14030(20)	6^+												
14110(20)	2^+					75Bo14							
14340(20)	6^+												
14430(20)	8^-					89Pe06							
15270(20)	6^-					89Pe06							
15482(7)	8^-					89Pe06							
16400(20)	6^-												
16690(20)	$\langle 8^-\rangle$												
						Ref.							
		90Fi07		67Fi06		Ref.							
			67Fi06			Ref.							

Energy levels and branching ratios [00Hu06]. Part 3 $^{52}_{24}$Cr

E^*	J^π	Branching ratios in percentage									
	E_f^*:	3114	3162	3415	3472	3616	3772	3951	4015	4039	4627
[keV]	J_f^π:	6^+	2^+	4^+	3^+	5^+	2^+	2^+	5^+	4^+	4^+
3615.92(2)	5^+	2.7(3)		0.97(3)							
4015.50(3)	5^+	4.2(4)		37(1)		17.5(7)					
4039.2(6)	4^+				100						
4563.0(8)	3^-						x				
4750.3(2)	$\langle 8\rangle^+$	100									
4805.9(2)	$\langle 6^+\rangle$	16(2)				15(3)			69(6)		
5396.8(3)	$\langle 7^+\rangle$								13.2(14)		
11262(2)	3^+	12(4)		19(3)	<2	<4					
11273(2)	$\langle 5^+\rangle$			2(1)				6(2)	15(3)		
11399(3)	4^+	2(1)		9(1)		11(1)			x	x	
11691(3)	2^+		3(1)	2(1)	8(2)				x	x	
12033(6)	$\langle 8\rangle^-$			23(2)	4(2)						11(1)
12039(5)	3^+		16(1)	5(1)	12(1)						
12101(5)	4^+			12(2)	4(1)	6(1)		5(1)	3	7(1)	7(1)
12793(6)	4^+					45					

Energy levels and branching ratios [00Hu06]. Part 4 $^{52}_{24}$Cr

E^*	J^π	Branching ratios in percentage									
	E_f^*:	4740	4750	4806	4841.3	5054.3	5097.3	5396.8	5446.4	5563.5	5664.4
[keV]	J_f^π:	2^+	$\langle 8\rangle^+$	$\langle 6^+\rangle$	1^+,2^+	4^+	2^+	$\langle 7^+\rangle$	4^+	X^+	$\langle 2\rangle^+$
5396.8(3)	$\langle 7^+\rangle$			87(5)							
5824.7(4)	$\langle 8^+\rangle$							100			
6365.3(11)	$\geq 8^+$		100								
6452.4	$\langle 9^+\rangle$		100								
11399(3)	4^+								12(2)	25(2)	
11691(3)	2^+	10(1)		x	x	3(2)			14(1)		6(1)
12033(6)	$\langle 8\rangle^-$								5(1)	5(1)	
12039(5)	3^+			5(1)					11(1)		
12101(5)	4^+						3(1)		7(2)		

Energy levels and branching ratios [00Hu06]. Part 5 $^{52}_{24}$Cr

E^*	J^π	Branching ratios in percentage										
	E_f^*:	5725.1	5737	5824.7	5860.4	6035.1	6205.1	6375.1	6389.5	6453.4	6795.2	7237.9
[keV]	J_f^π:	X^+	$\langle 4^+\rangle$	$\langle 8^+\rangle$					X^+	$\langle 9^+\rangle$	3^-	$\langle 10\rangle$
6453.4(5)	$\langle 9^+\rangle$			100								
7237.9(7)	$\langle 10\rangle$									100		
8216.5(9)	$\langle 11\rangle$											100

(continued) **$^{52}_{24}$Cr**

E^*	J^π	Branching ratios in percentage										
	E_f^*:	5725.1	5737	5824.7	5860.4	6035.1	6205.1	6375.1	6389.5	6453.4	6795.2	7237.9
[keV]	J_f^π:	X^+	$\langle 4^+\rangle$	$\langle 8^+\rangle$					X^+	$\langle 9^+\rangle$	3^-	$\langle 10\rangle$
11273(2)	$\langle 5^+\rangle$	25(3)				5(2)	9(3)	6(2)			18(3)	
11691(3)	2^+								9(1)			
12101(5)	4^+		9(2)		9(2)							

Energy levels and branching ratios [99Hu14]. **$^{53}_{24}$Cr**

E^*	$2J^\pi$	L	σ (α,d)	L	C^2S	S_N	σ (d,p)	σ (t,d)	S_n^+	S_n^+	L	S_N	S_N	C^2S	Ref.
[keV]		(α,d)	μb/sr		(d,p)	(d,p)	μb/sr	μb/sr	(t,d)	(d,p)		(p,d)	(d,t)	(τ,α)	
0.0	3^-	2+4	550	1	2.22	0.76	16000	1150(60)	0.50(2)	0.53(2)	1	0.83	0.66	1.1	68Ra17
564.03(4)	1^-	2+4	240	1	0.71	0.61	6800	520(30)	0.39(2)	0.40(4)	1	0.31	0.24	0.26	68Ra17
1006.3(1)	5^-	0=6	420	3	1.50	0.50	1000	270(20)	0.37(4)	0.34(3)	3	0.51	0.54	0.90	68Ra17
1289.5(1)	7^-	2+4	360	$\langle 3\rangle$	0.43	0.07	270	130(20)		0.05(1)	3	0.70	0.68	0.48	76Bi02
1536.6(1)	7^-			$\langle 3\rangle$	0.13	0.04	90				3	3.2	2.3	3.36	68Ra17
1973.7(1)	5^-	2+4	260				70*					<0.08			74Ka14
2172.3(1)	11^-	4	230												74Ka14
2233.2(2)	9^-														
2320.7(2)	3^-	2+4	99	1	0.96	0.29	9700*					<0.02			68Ra17
2453.1(6)	7^-,9^-	2+4	119	$\langle 1\rangle$	0.01										68Ra17
2656.4(4)	5^-,7^-			3	0.58	0.18	480					<0.08			68Ra17
2669.9(5)	1^-			1	0.11	0.09	1500								68Ra17
2705.9(2)	11^-	0+2	1130									<0.01			74Ka14
2708.5(3)	3^-														
2723(10)	1^-,3^-			1	0.04		530								68Ra17
2771.0(10)	5^-,7^-													0.08	69Da02
2826.5(2)	11^-														
2992.9(7)	5^-,7^-			$\langle 3\rangle$	0.13	0.04	100								68Ra17
3084.1(2)	15^-	0+2	1160												74Ka14
3137.1(6)				$\langle 2\rangle$	0.01										68Ra17
3172.1(10)															
3180.1(2)	$\langle 3\rangle^-$			$\langle 1\rangle$	0.04	0.01	160*								68Ra17
3243.6(2)	13	4	650												74Ka14
3262.1(2)	$\langle 5\rangle^+$			2	0.03	0.004	90*								68Ra17
3351(6)	7^-,5^-			$\langle 3\rangle$	0.15		150				3	1.2		1.15	68Ra17
3381.7(10)	7^-														
3434.6(15)	7^-,5^-						100				3	0.30		0.35	78Fo34
3592.4(3)	13^-										1	0.12(3)			67Wh02
3599(1)				1	0.06									0.15	68Ra17
3602(6)															
3616.5(2)	1^-		310	1	0.77	0.48	9400*								68Ra17
3695.5(19)															
3706.5(15)	9^+	1=7	760	4	5.20	0.57	2000							0.14	68Ra17

(continued) **$^{53}_{24}$Cr**

E^* [keV]	$2J^\pi$	L (α,d)	σ (α,d) μb/sr	L	C^2S (d,p)	S_N (d,p)	σ (d,p) μb/sr	σ (t,d) μb/sr	S_n^+ (t,d)	S_n^+ (d,p)	L	S_N (p,d)	S_N (d,t)	C^2S (τ, α)	Ref.
3781(7)															
3838(6)														0.09	69Da02
3971.1(10)														0.06	69Da02
3985.2(7)	$\langle 3\rangle^+$			2	0.08	0.01	260								68Ra17
4046(7)	1^-,3^-			$\langle 1\rangle$	0.01										68Ra17
4073(7)	1^-,3^-			$\langle 1\rangle$	0.03										68Ra17
4128(7)															
4135.1(6)	5^+,3^+			2	0.54	0.10	3600								68Ra17
4171(7)															
4186.6(6)															
4204(10)															
4230.5(7)	5^+,3^+			2	0.21	0.05	1900							0.56	78Fo34
4286(7)															
4293.7(7)															
4317(7)															
4331(7)															
4349.8(4)	15													0.11	69Da02
4361.6(20)															
4390(10)															
4427(7)	1^+			$\langle 0\rangle$	0.03						0	1.40		1.1	68Ra17
4453(7)															
4484(7)	$\langle 1^+\rangle$			$\langle 0\rangle$	0.08	0.04	1300								68Ra17
4500(7)															
4522(7)															
4530(7)														0.15	69Da02
4551(10)															
4570(7)															
4610(7)	1^-,3^-			1	0.19										68Ra17
4642(7)	3^+,5^+			2	0.17										68Ra17
4661(7)	5^-,7^-			3	0.68										68Ra17
4675(7)	$\langle 3\rangle^+$										2	0.85			67Wh02
4690(7)	1^+			0	0.12										68Ra17
4696.91(21)															
4710(20)	3^+,5^+													0.96	69Da02
4745(7)															
4790(7)															
4804(7)															
4815(7)															
4850(10)															
4884(7)															
4906(10)															
4929(7)															
4967(10)															
5001.3(6)															
5047(10)															

(continued) **$^{53}_{24}$Cr**

E^* [keV]	$2J^\pi$	L (α,d)	σ (α,d) μb/sr	L	C^2S (d,p)	S_N (d,p)	σ (d,p) μb/sr	σ (t,d) μb/sr	S_n^+ (t,d)	S_n^+ (d,p)	L	S_N (p,d)	S_N (d,t)	C^2S (τ,α)	Ref.
5093(10)	$\langle 3^+,5^+\rangle$			$\langle 2\rangle$											
5123(10)	$3^+,5^+$			2	0.06										68Ra17
5140(1)															
5174(10)															
5208(10)															
5225(10)															
5265(10)															
5274(10)															
5310(10)															
5330(10)															
5397(10)	$1^-,3^-$			1	0.1										68Ra17
5420(10)	$3^+,5^+$			2	0.12										68Ra17
5452(10)	$1^-,3^-$			1	0.07										68Ra17
5471(10)															
5514(15)															
5557(10)	$\langle 1^-,3^-\rangle$			$\langle 1\rangle$	0.02									0.18	69Da02
5584(10)															
5596(10)															
5624(10)															
5674(10)															
5701(10)															
5736(10)															
5750(10)															
5805(10)															
5843(10)															
5862(10)															
5877(10)															
5900(10)															
5937(10)															
5951(10)															
5962(10)															
5976(10)															
5996(10)															
6039(10)															
6068(10)															
6114(10)															
6135(10)															
6154(10)															
6180(10)															
6216(10)															
6224(10)	$\langle 1^+\rangle$														
6258(10)															
6305(10)				0	0.15										68Ra17
6335(10)															
6370(10)															

(continued) **$^{53}_{24}$Cr**

E^* [keV]	$2J^\pi$	L (α,d)	σ (α,d) μb/sr	L	C^2S (d,p)	S_N (d,p)	σ (d,p) μb/sr	σ (t,d) μb/sr	S_n^+ (t,d)	S_n^+ (d,p)	L	S_N (p,d)	S_N (d,t)	C^2S (τ,α)	Ref.
6387(10)															
6415(10)															
6430(10)															
6445(10)															
6460(10)															
6495(10)															
6524(10)				2	0.16										68Ra17
6550(10)															
6575(10)															
6600(10)															
6630(10)				2	0.18										68Ra17
6665(10)				0	0.03										68Ra17
6700(10)				0	0.03										68Ra17
6735(10)				2	0.2										68Ra17
6781(10)															
6800(10)															
6831(10)	1^+														
6873(10)															
6896(10)															
6927(10)	3^+,5^+														
6961(10)	1^+														
7004(10)															
7025(10)															
7056(10)															
7080(10)															
7120(10)															
7140(10)															
7167(10)	1^+														
7225(10)															
7288(10)															
7300(10)															
7321(10)															
7385(10)															
7440(10)															
7484(10)															
7500(10)															
7542(10)															
7573(10)															
7605(10)															
7619(10)															
7940.20(11)	3^-														
10650(20)	7^-													1.3	69Da02
12520(20)	1^+													0.39	69Da02
12590(20)	3^+,5^+													1.12	69Da02

(continued) **$^{53}_{24}$Cr**

E^*	$2J^\pi$	L	σ (α,d)	L	C^2S	S_N	σ (d,p)	σ (t,d)	S_n^+	S_n^+	L	S_N	S_N	C^2S	Ref.
[keV]		(α,d)	μb/sr		(d,p)	(d,p)	μb/sr	μb/sr	(t,d)	(d,p)		(p,d)	(d,t)	(τ,α)	
					68Ra17	72Ko41	72Ko41		76Bi02	76Bi02			75Bo01	69Da02	Ref.
								76Bi02				67Wh02			Ref.

Additional data on this isotope can be found in [98En05, 91Al14, 91Ba37, 79Po16, 77Bo01, 75Bo01, 70Ca05, 69De17, 67Po07, 67Fi06, 66Le15, 64Bo08].

Abundance: 9.501(17) %.

* Levels observed in (γ,γ') reaction; $B(M1)$, $B(E1)$ and $B(E2)$ can be found in [98En05].

In the central part of the Table the performed in [76Bi02] comparison of corrected values of spectroscopic factors of neutron transfer S_{dp}=S_n^+ in (d,p) reaction and S_n^+ in (t,d) reaction is presented and agreement is evident.

Three parameters of neutron pickup reactions (p,d) [67Wh02], (d,t) [75Bo01] and (τ,α) [69Da02] are presented at right.

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

Energy levels and branching ratios [99Hu14]. Part 2 **$^{53}_{24}$Cr**

E^*	$2J^\pi$	σ (d,p)	L	L	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
							E_f^*:	0.0	564	1006	1290	1537
[keV]		μb/sr			Γ_{cm}		$2J_f^\pi$:	3^-	1^-	5^-	7^-	7^-
0.0	3^-		1	1	Stable	68Ra17						
564.03(4)	1^-		1	1	0.51(6) ps	68Ra17		100				
1006.3(1)	5^-		3	3	7.1(6) ps	68Ra17		100	0.43			
1289.5(1)	7^-		3	3	1.17(8) ps	76Bi02		94(1)		6(1)		
1536.6(1)	7^-		3	3	23.0(11) ps	68Ra17		9(2)		65(2)	26(2)	
1973.7(1)	5^-				0.39(5) ps	74Ka14		84(2)			16(2)	
2172.3(1)	11^-				9.6(10) ps	74Ka14					100	
2233.2(2)	9^-				0.36(5) ps							100
2320.7(2)	3^-				0.8(5) fs	68Ra17		100				
2453.1(6)	7^-,9^-					68Ra17				60(8)	40(8)	
2656.4(4)	5^-,7^-				<0.02 ps	68Ra17		5		68(7)	27(7)	
2669.9(5)	1^-					68Ra17		60	40			
2705.9(2)	11^-				2.4(10) ps	74Ka14						
2708.5(3)	3^-							11(2)	46(5)	29(5)		
2723(10)	1^-,3^-					68Ra17						
2771.0(10)	5^-,7^-			3		69Da02					100	
2826.5(2)	11^-				0.11(3) ps							
2992.9(7)	5^-,7^-					68Ra17				42(7)	58(7)	
3084.1(2)	15^-				30(11) ps	74Ka14						
3137.1(6)					0.04(2) ps	68Ra17					100	
3172.1(10)								100				
3180.1(2)	$\langle 3\rangle^-$					68Ra17		25(3)	50(10)	15(4)	10(4)	
3243.6(2)	13				0.6(2) ps	74Ka14						
3262.1(2)	$\langle 5\rangle^+$					68Ra17		57(6)		23(6)		20(5)

(continued) **$^{53}_{24}$Cr**

E^* [keV]	$2J^\pi$	σ (d,p) μb/sr	L	L	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage				
							E_f^*:	0.0	564	1006	1290	1537
							$2J_f^\pi$:	3^-	1^-	5^-	7^-	7^-
3351(6)	7^-,5^-			3		68Ra17						
3381.7(10)	7^-											100
3434.6(15)	7^-,5^-			3		78Fo34					100	
3592.4(3)	13^-				0.13(4) ps	67Wh02						
3599(1)				1		68Ra17						
3602(6)												
3616.5(2)	1^-					68Ra17		100				
3695.5(19)								100				
3706.5(15)	9^+			4		68Ra17					100	
3781(7)												
3838(6)						69Da02						
3971.1(10)				1		69Da02			100			
3985.2(7)	$\langle 3\rangle^+$					68Ra17		25(5)	75(5)			
4046(7)	1^-,3^-					68Ra17						
4073(7)	1^-,3^-					68Ra17						
4128(7)												
4135.1(6)	5^+,3^+					68Ra17		17(2)		37(3)		
4171(7)												
4186.6(6)												
4204(10)												
4230.5(7)	5^+,3^+			2		78Fo34				84(8)	16(3)	
4286(7)												
4293.7(7)												
4317(7)												
4331(7)												
4349.8(4)	15			3	<0.12 ps	69Da02						
4361.6(20)											100	
4390(10)												
4427(7)	1^+			0		68Ra17						
4453(7)												
4484(7)	$\langle 1^+\rangle$					68Ra17						
4500(7)												
4522(7)												
4530(7)				3		69Da02						
4551(10)												
4570(7)												
4610(7)	1^-,3^-					68Ra17						
4642(7)	3^+,5^+					68Ra17						
4661(7)	5^-,7^-					68Ra17						
4675(7)	$\langle 3\rangle^+$					67Wh02						
4690(7)	1^+					68Ra17						
4696.91(21)					0.22(6) ps							
4710(20)	3^+,5^+			2		69Da02						
4745(7)												
4790(7)												

(continued) **$^{53}_{24}$Cr**

E^* [keV]	$2J^\pi$	σ (d,p) μb/sr	L	L	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage				
							E_f^*:	0.0	564	1006	1290	1537
							$2J_f^\pi$:	3^-	1^-	5^-	7^-	7^-
4804(7)												
4815(7)												
4850(10)												
4884(7)												
4906(10)												
4929(7)												
4967(10)												
5001.3(6)					0.10(+3-4) ps							
5047(10)												
5093(10)	$\langle 3^+,5^+\rangle$											
5123(10)	$3^+,5^+$					68Ra17						
5140(1)												
5174(10)												
5208(10)												
5225(10)												
5265(10)												
5274(10)												
5310(10)												
5330(10)												
5397(10)	$1^-,3^-$					68Ra17						
5420(10)	$3^+,5^+$					68Ra17						
5452(10)	$1^-,3^-$					68Ra17						
5471(10)												
5514(15)												
5557(10)	$\langle 1^-,3^-\rangle$			3		69Da02						
5584(10)												
5596(10)												
5624(10)												
5674(10)												
5701(10)												
5736(10)												
5750(10)												
5805(10)												
5843(10)												
5862(10)												
5877(10)												
5900(10)												
5937(10)												
5951(10)												
5962(10)												
5976(10)												
5996(10)												
6039(10)												
6068(10)												
6114(10)												

(continued) **$^{53}_{24}$Cr**

E^*	$2J^\pi$	σ (d,p)	L	L	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
							E_f^*:	0.0	564	1006	1290	1537
[keV]		μb/sr			Γ_{cm}		$2J_f^\pi$:	3^-	1^-	5^-	7^-	7^-
6135(10)												
6154(10)												
6180(10)												
6216(10)												
6224(10)	$\langle 1^+ \rangle$											
6258(10)												
6305(10)						68Ra17						
6335(10)												
6370(10)												
6387(10)												
6415(10)												
6430(10)												
6445(10)												
6460(10)												
6495(10)												
6524(10)						68Ra17						
6550(10)												
6575(10)												
6600(10)												
6630(10)						68Ra17						
6665(10)						68Ra17						
6700(10)						68Ra17						
6735(10)						68Ra17						
6781(10)												
6800(10)												
6831(10)	1^+											
6873(10)												
6896(10)												
6927(10)	$3^+,5^+$											
6961(10)	1^+											
7004(10)												
7025(10)												
7056(10)												
7080(10)												
7120(10)												
7140(10)												
7167(10)	1^+											
7225(10)												
7288(10)												
7300(10)												
7321(10)												
7385(10)												
7440(10)												
7484(10)												
7500(10)												

(continued) **$^{53}_{24}$Cr**

E^*	$2J^\pi$	σ (d,p)	L	L	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
							E_f^*: 0.0	564	1006	1290	1537
[keV]		μb/sr			Γ_{cm}		$2J_f^\pi$: 3^-	1^-	5^-	7^-	7^-
7542(10)											
7573(10)											
7605(10)											
7619(10)											
7940.20(11)	3^-						18(1)	9(1)	10(1)		
10650(20)	7^-			3		69Da02					
12520(20)	1^+			0		69Da02					
12590(20)	3^+,5^+			2		69Da02					
						Ref.					
						Ref.					

Energy levels and branching ratios [99Hu14]. Part 3 **$^{53}_{24}$Cr**

E^*	$2J^\pi$	Branching ratios in percentage								
	E_f^*:	1974	2172	2233	2321	2656	2670	2706	2708	2826
[keV]	$2J_f^\pi$:	5^-	11^-	9^-	3^-	5^-,7^-	1^-	11^-	3^-	11^-
2453.1(6)	7^-,9^-		x							
2705.9(2)	11^-		100							
2708.5(3)	3^-	14(3)			<5					
2826.5(2)	11^-			100						
2992.9(7)	5^-,7^-					x				
3084.1(2)	15^-		99(3)					0.7(3)		
3243.6(2)	13		x							
3592.4(3)	13^-									100
4135.1(6)	5^+,3^+				46(4)					
7940.20(11)	3^-	11(1)			4(1)		4(1)		7(1)	

Energy levels and branching ratios [99Hu14]. Part 4 **$^{53}_{24}$Cr**

E^*	$2J^\pi$	Branching ratios in percentage						
	E_f^*:	3084	3180	3262	3592	3617	4187	4294
[keV]	$2J_f^\pi$:	15^-	$\langle 3\rangle^-$	$\langle 5\rangle^+$	13^-	1^-		
3243.6(2)	13	x						
4349.8(4)	15				100			
4696.91(21)		100						
5001.3(6)		100						
7940.20(11)	3^-		8(1)	15(1)		3(1)	7(1)	3(1)

Energy levels and branching ratios [87Wa04, 93Hu04]. **$^{54}_{24}$Cr**

E^* [keV]	J^π	L (d,p)	S_N (d,p)	σ (d,p) μb/sr	S_{dp} (d,p)	$2j_n$	S_N (^{6}Li,d)	σ (t,p) arb.u	N (α,^{2}He)	$T_{1/2}$ or Γ_{cm}	Ref.
0.0	0^+	1	0.013	1100	1.18	3–	1.0**	390	230(60)	Stable	66Ma42
834.855(3)	2^+	1	0.0275	1400	0.27	1–	0.47	146		7.9(3) ps	66Ma42
		1		2200	0.40	3–					75Ko19
1823.92(7)	4^+	3		240	0.37	5–	0.14	9		1.7(3) ps	77Fu03
2619.68(4)	2^+	1	0.040	4300	0.54	3–		12		78(15) fs	66Ma42
2829.61(5)	0^+	1	0.0095	880	0.54	3–		114		0.15(+6-4) ps	66Ma42
3074.07(6)	2^+	1	0.0325	3300	0.40	3–		154		7.1(4) fs	66Ma42
3159.56(10)	4^+							5		0.24(+5-4) ps	68Ch20
3222.33(11)	6^+									0.49(14) ps	
3393.41(7)	$\langle 1^-,2^-\rangle$			1800	0.26*	3–				15(+14-7) fs	75Ko19
3436.88(6)	2^+	1	0.021		0.81*	5–		22		8(3) fs	66Ma42
3468											
3514(7)											
3655.22(21)	4^+							13		<6 fs	68Ch20
3720.03(5)	$1^+,2^+$	1	0.0218	1900	0.23*	1–		9		16.6(14) fs	66Ma42
3785.68(11)	$\langle 4,5\rangle^+$									>2.8 ps	
3798.54(12)	4^+							17		51(+9-8) fs	68Ch20
3861.02(5)	2^+			1200	0.15*	1–		29			68Ch20
3870.4(5)										>28 fs	
3925.55(7)	$\langle 0,1,2\rangle$										
3927.69(8)	2^+	1	0.0220	870	0.11*	3–		3			66Ma42
3987.42(21)	$[4^+]$								60(30)	>42 fs	90Fi07
4012.90(7)	0^+							50		1.4(+21-14) fs	68Ch20
4042.52(20)	5^+									28(+13-10) fs	
4083.22(6)	$\langle 2\rangle^+$			590	1.36*	5–		1			68Ch20
4126.72(16)	2			incl	incl			110			68Ch20
4127.12(7)	3^-							incl			
4190.8(5)	2^+			190	0.44*	5–		14			68Ch20
4217.51(5)	$\langle 2\rangle^+$			incl							
4239.1(5)	3^-										
4256.4(4)	2^+										
4380.95(11)	$\langle 1^-,3^-\rangle$	1	0.0226	3300	0.39*	3–					66Ma42
4451.0(5)	4^+										
4458.4(5)	$1^+,\langle 2^+\rangle$										
4570.8(9)	$\langle 2^-\rangle,3^-$										
4583(5)	0^+							172			68Ch20
4618(6)	X^-							176			68Ch20
4633.60(14)	2^+	2	0.0188	810	0.20*	5+					66Ma42
4680.83(18)	8^+									0.55(7) ps	
4740											
4844.7(9)	2^-										
4866(4)	$\langle 1^-,4^+\rangle$							68			68Ch20
4872.36(6)	1,2			1400	0.14*	1–					
4921(7)	$[4^+]$								170(50)		90Fi07
4936(6)	X^-										

(continued) **$^{54}_{24}$Cr**

E^* [keV]	J^π	L (d,p)	S_N (d,p)	σ (d,p) μb/sr	S_{dp} (d,p)	$2j_n$	S_N (^{6}Li,d)	σ (t,p) arb.u	N (α,^{2}He)	$T_{1/2}$ or Γ_{cm}	Ref.
4997(7)											
5017(10)											
5026(10)											
5062(8)	4^+										
5084.9(3)	$\langle 7 \rangle$										
5113.6(5)	2^+										
5156(10)											
5189.60(12)	2^+										
5191(10)	X^-										
5215(10)											
5226.55(11)	2^+										
5268.46(10)	2^+										
5275(6)	2^+										
5291.3(6)	3^+										
5294.23(9)	1^+,2^+	1	0.017	2000	0.19*	1–					66Ma42
5321(10)	$\langle 2,3 \rangle^-$										
5345.7(12)	2										
5362.99(21)	7^+									0.24(6) ps	
5387(10)											
5458(5)	2^+			1000	0.09*	1–					75Ko19
5498(10)											
5557(6)	4^+										
5586.87(7)	$\langle 1–3 \rangle^-$										
5670(10)											
5698(10)											
5740(10)											
5776	X^-										
5794.5(4)	$\langle 7 \rangle$								45(10)		
5821.51(13)	$\langle 0,1,2 \rangle$										
5856.4(4)	$\langle 0,1,2 \rangle$										
5893(10)	$X^{\langle + \rangle}$	$\langle 1 \rangle$	0.0116	2000	0.18*	1–					75Ko19
5935(10)											
5981(10)	X^-										
6113(10)	X^-										
6120(10)											
6142.30(17)	$\langle 0,1,2 \rangle$			1600	0.14*	1–					75Ko19
6193(10)											
6212(10)											
6255(10)											
6289(10)											
6316.36(9)	$\langle 0,1,2 \rangle$										
6350(10)											
6374(10)											
6391(10)											
6421(10)											

(continued) **$^{54}_{24}$Cr**

E^* [keV]	J^π	L (d,p)	S_N (d,p)	σ (d,p) μb/sr	S_{dp} (d,p)	$2j_n$	S_N (^{6}Li,d)	σ (t,p) arb.u	N (α,^{2}He)	$T_{1/2}$ or Γ_{cm}	Ref.
6445.3(5)	⟨9⟩										
6510(10)											
6525(10)											
6556(10)											
6585(10)											
6617.0(4)	9^+										
6633(10)											
6658(10)											
6678(10)											
6699(10)											
6719.8(9)	$\langle 10\rangle^+$							87		<0.10 ps	68Ch20
6723.4(5)	10^+										
6743(10)											
6780(10)											
6814(10)											
6831(10)											
6875(10)											
6899(10)											
6941(10)											
6960(10)											
6991(10)								98			68Ch20
7050(10)											
7084(10)											
7103(10)											
7127(10)											
7159(10)											
7174(10)											
7199(10)											
7234.5(4)	⟨9⟩										
7290.1(4)	⟨9⟩										
7370											
7400											
7590	$X^{\langle -\rangle}$	⟨0⟩	0.0272								66Ma42
7850											
7894.3(9)	⟨10⟩										
8236.2(5)	$\langle 11^+\rangle$										
8300											
8500											
8824.6(8)	$\langle 12^+\rangle$										
8857.1(7)	⟨10⟩										
8990	X^+										
9153.6(5)	⟨11⟩										
9300											
9420	X^+										
9633.7(9)	$\langle 12^+\rangle$										

(continued) $^{54}_{24}$Cr

E^*	J^π	L	S_N	σ (d,p)	S_{dp}	$2j_n$	S_N	σ (t,p)	N	$T_{1/2}$ or	Ref.
[keV]		(d,p)	(d,p)	μb/sr	(d,p)		(^{6}Li,d)	arb.u	(α,^{2}He)	Γ_{cm}	
9971.0(7)	$\langle 13^+ \rangle$										
10550.8(10)	$\langle 11^+ \rangle$										
11113.8(9)	$\langle 11 \rangle$										
11785.1(9)	$\langle 15^+ \rangle$										
12539.1(11)	$\langle 13 \rangle$										
			66Ma42	75Ko19	75Ko19	75Ko19		68Ch20			Ref.

Additional data on this isotope can be found in [01Wa36, 00De01, 96Ne05, 67Wh02, 64Bo08].
Abundance: 2.365(7) %.
* Value is $S_{dp}\cdot(2J_f+1)/4$ [75Ko19].
** Normalized to 1.0 for the ground state.
Parameter N=($d\sigma/d\Omega$ (exp))/($d\sigma/d\Omega$ (DWBA)) has a meaning of S_N in the case of two-neutron transfer reaction (α,^{2}He).
L=1, S_N=0.017 and L=(1), S_N=0.0116 were found [66Ma42] for states at E^*=5294 and 5893 keV.
Data for this isotope are considered in vol. LB I/18A.

Energy levels and branching ratios [87Wa04, 93Hu04]. Part 2 $^{54}_{24}$Cr

E^*	J^π	Branching ratios in percentage									
	E_f^*:	0.0	835	1824	2620	2830	3074	3160	3222	3393	3437
[keV]	J_f^π:	0^+	2^+	4^+	2^+	0^+	2^+	4^+	6^+	$\langle 1^-,2^- \rangle$	2^+
834.855(3)	2^+	100									
1823.92(7)	4^+		100								
2619.68(4)	2^+	4.1(3)	96(1)								
2829.61(5)	0^+		100								
3074.07(6)	2^+	1.1(2)	99(5)								
3159.56(10)	4^+		47(12)	53(10)							
3222.33(11)	6^+			100							
3393.41(7)	$\langle 1^-,2^- \rangle$	37(3)	63(4)								
3436.88(6)	2^+		97(6)		2.9(4)						
3655.22(21)	4^+			100							
3720.03(5)	$1^+,2^+$	79(4)			13(1)	9(1)					
3785.68(11)	$\langle 4,5 \rangle^+$			67(7)				5(2)	28(1)		
3798.54(12)	4^+		30(8)	39(9)				31(4)			
3861.02(5)	2^+		38(3)		62(4)						
3870.4(5)			x								
3925.55(7)	$\langle 0,1,2 \rangle$		85(15)	x		x					
3927.69(8)	2^+	100									
3987.42(21)	$[4^+]$									100	
4012.90(7)	0^+		100		x						
4042.52(20)	5^+			15(1)					85(3)		
4083.22(6)	$\langle 2 \rangle^+$			69(2)	13(1)		2.1(9)	12(1)			3.4(6)
4126.72(16)	2						x				

(continued) **$^{54}_{24}$Cr**

E^*	J^π					Branching ratios in percentage						
		E_f^*:	0.0	835	1824	2620	2830	3074	3160	3222	3393	3437
[keV]		J_f^π:	0^+	2^+	4^+	2^+	0^+	2^+	4^+	6^+	$\langle 1^-,2^-\rangle$	2^+
4127.12(7)	3^-			68(16)		32(10)						
4190.8(5)	2^+		x	x								
4217.51(5)	$\langle 2\rangle^+$			46(12)	42(8)	12(8)						
4239.1(5)	3^-			x		x						
4256.4(4)	2^+		x	x								
4380.95(11)	$\langle 1^-,3^-\rangle$			100								
4451.0(5)	4^+				100							
4458.4(5)	$1^+,\langle 2^+\rangle$		x									
4570.8(9)	$\langle 2^-\rangle,3^-$				x							
4633.60(14)	2^+					x	100					
4680.83(18)	8^+									100		
4844.7(9)	2^-			x								
4872.36(6)	1,2		63(5)					15(1)	x			13.7(1)
5113.6(5)	2^+		x	x								
5189.60(12)	2^+		x				x					
5226.55(11)	2^+			x					19(10)			
5268.46(10)	2^+		x	57(9)								9(6)
5291.3(6)	3^+		x	x								
5294.23(9)	$1^+,2^+$			57(7)		30(3)	13(5)					
5345.7(12)	2			x								
5362.99(21)	7^+									23(1)		
5586.87(7)	$\langle 1–3\rangle^-$			40(9)		38(7)						
5794.5(4)	$\langle 7\rangle$									100		
5856.4(4)	$\langle 0,1,2\rangle$			100								
6142.30(17)	$\langle 0,1,2\rangle$										38(15)	

Energy levels and branching ratios [87Wa04, 93Hu04]. Part 3 **$^{54}_{24}$Cr**

E^*	J^π					Branching ratios in percentage						
		E_f^*:	3720	3926	3928	4043	4083	4127	4127	4381	4681	5085
[keV]		J_f^π:	$1^+,2^+$	$\langle 0,1,2\rangle$	2^+	5^+	$\langle 2\rangle^+$	2	3^-	$\langle 1^-,3^-\rangle$	8^+	$\langle 7\rangle$
3925.55(7)	$\langle 0,1,2\rangle$		15(3)									
4872.36(6)	1,2			3.0(6)	1.8(6)				3.6(6)			
5084.9(3)	$\langle 7\rangle$					100						
5189.60(12)	2^+						100					
5226.55(11)	2^+									81(10)		
5268.46(10)	2^+				34(6)							
5362.99(21)	7^+					15(1)					60(6)	1.7(2)
5586.87(7)	$\langle 1–3\rangle^-$						13(4)	9(4)				
5821.51(13)	$\langle 0,1,2\rangle$		100									
6316.36(9)	$\langle 0,1,2\rangle$						100					
6445.3(5)	$\langle 9\rangle$											100

(continued) **$^{54}_{24}$Cr**

E^*	J^π	Branching ratios in percentage									
	E_f^*:	3720	3926	3928	4043	4083	4127	4127	4381	4681	5085
[keV]	J_f^π:	1^+,2^+	⟨0,1,2⟩	2^+	5^+	⟨2⟩$^+$	2	3^-	⟨1^-,3^-⟩	8^+	⟨7⟩
6617.0(4)	9^+									32(1)	
6719.8(9)	⟨10⟩$^+$									100	
6723.4(5)	10^+									100	
7234.5(4)	⟨9⟩									40(1)	
7290.1(4)	⟨9⟩									50(2)	
7894.3(9)	⟨10⟩									100	

Energy levels and branching ratios [87Wa04, 93Hu04]. Part 4 **$^{54}_{24}$Cr**

E^*	J^π	Branching ratios in percentage										
	E_f^*:	5294	5363	5794	6617	6723	7234	7290	8236	8857	9154	9971
[keV]	J_f^π:	1^+,2^+	7^+	⟨7⟩	9^+	10^+	⟨9⟩	⟨9⟩	⟨11^+⟩	⟨10⟩	⟨11⟩	⟨13^+⟩
6142.30(17)	⟨0,1,2⟩	62(7)										
6617.0(4)	9^+		68(3)									
7234.5(4)	⟨9⟩		38(1)		22(1)							
7290.1(4)	⟨9⟩		15.5(7)	35(2)								
8236.2(5)	⟨11^+⟩				87(3)	12.7(10)						
8824.6(8)	⟨12^+⟩					100						
8857.1(7)	⟨10⟩							100				
9153.6(5)	⟨11⟩					71(3)	29(3)					
9633.7(9)	⟨12^+⟩					100						
9971.0(7)	⟨13^+⟩								100			
10550.8(10)	⟨11^+⟩					100						
11113.8(9)	⟨11⟩									100		
11785.1(9)	⟨15^+⟩											100
12539.1(11)	⟨13⟩										100	

Energy levels and branching ratios [91Hu07]. **$^{55}_{24}$Cr**

E^*	$2J^\pi$	L	σ (t,p)	L	σ (d,p)	S'	S'	S'	$T_{1/2}$ or	Ref.
[keV]		(t,p)	μb/sr	(d,p)	μb/sr	(d,p)	(d,p)	(d,p)	Γ_{cm}	
0.0	3^-	0	1210	1	14100	2.09	2.3	2.06	3.497(3) m	72Ma66
241.91(4)	1^-	2	160	1	2090	0.32	0.32	0.39		72Ma66
517.70(4)	5^-	2	160	3	700	1.39	1.2	1.40	<5.2 ps	72Ma66
565.91(3)	3^-	0+2	60+70	1	2900	0.42	0.40	0.47		72Ma66
880.71(4)	5^-	2	40	3	370	0.81	0.86	0.94		72Ma66
1131(10)										
1214.75(5)	5^-			3	130	0.26	0.30	0.29	3.5(+69-14) ps	72Ma66

(continued) **$^{55}_{24}$Cr**

E^* [keV]	$2J^\pi$	L (t,p)	σ (t,p) μb/sr	L (d,p)	σ (d,p) μb/sr	S' (d,p)	S' (d,p)	S' (d,p)	$T_{1/2}$ or Γ_{cm}	Ref.
1438.82(7)	$\langle 9\rangle^-$	4	40						4.2(14) ps	72Ma66
1474.20(6)	1^-	[0]	[40]	1	6890	0.83	1.3	0.97		72Ma66
1479.03(12)	$\langle 7^-\rangle$	[2]	[30]		incl					72Ma66
2008(7)	5^+		80	2	4140	1.11	1.0	1.35		72Ma66
2083.85(13)	3^-	[0]	870		1370		0.46			72Ma66
2086.10(12)	9^+	[3]	10	4	incl	6.3		6.7		72Ma66
2269.24(18)	1^+			0	5600	0.16		0.23		72Ma66
2320(10)	3^-	0	1000	1	150	0.02				72Ma66
2355(10)					70					72Ma66
2390.40(12)	$\langle 11\rangle$									
2545(10)	$\langle 5^-,7^-\rangle$	2	130	$\langle 3\rangle$	220	0.35		0.4		72Ma66
2596(10)	$5^-,7^-$	$\langle 2\rangle$	40	3	280	0.43		0.48		72Ma66
2686.99(14)	$1^-,3^-$	4	10	1	60	0.1		0.1		72Ma66
2710(10)	3^-	0	140	1	650	0.07				72Ma66
2755.49(15)	$\langle 13^-\rangle$				300				<3.5 ps	72Ma66
2874(10)	$3^+,5^+$			2	100	0.01				72Ma66
2880.36(13)	$\langle 13^+\rangle$									
2894.54(13)	1^-	4	60	1	4000	0.40	0.37	0.43		72Ma66
3009(10)					160					72Ma66
3017(10)	$1^-,3^-$	2	80	1	340	0.04		0.04		72Ma66
3114(10)	$X^{\langle+\rangle}$	3	60		50					72Ma66
3145(10)	5^-			3	570	0.7	0.75	0.8		72Ma66
3200(10)	$1^-,3^-$			1	40	0.02				72Ma66
3212(10)	$\langle 1\rangle$			1	160					72Ma66
3306.22(20)	$\langle 15\rangle$				230				2.1(14) ps	72Ma66
3351(10)	$1^-,3^-$			1	420	0.04				72Ma66
3519(10)	$\langle 1^-,3^-\rangle$			$\langle 1\rangle$	180	0.02				72Ma66
3574(10)	3^-				40					72Ma66
3631(10)					100					72Ma66
3696(10)	$\langle 1^-,3^-\rangle$			$\langle 1\rangle$	120	0.02		0.02		72Ma66
3800(10)					70					72Ma66
3810(10)					70					72Ma66
3828(10)					780					72Ma66
3852(10)	$\langle 3^+,5^+\rangle$			$\langle 2\rangle$	350	0.06				72Ma66
3902(10)					80					72Ma66
3938(10)	$3^+,5^+$			2	170	0.03		0.04		72Ma66
4001(10)					70					72Ma66
4005.4(2)	$\langle \geq 15\rangle$									
4044.25(21)	1^+			0	850	0.02				72Ma66
4059(10)	$\langle 1^-,3^-\rangle$			$\langle 1\rangle$	730	0.06				72Ma66
4142(10)	$\langle 3^+,5^+\rangle$				1780					72Ma66
4181(10)	$1^-,3^-$			1	730	0.05				72Ma66
4276(10)					40					72Ma66
4308(10)										
4382(10)	1^+			0	5700	0.23		0.33		72Ma66

(continued) **$^{55}_{24}$Cr**

E^* [keV]	$2J^\pi$	L (t,p)	σ (t,p) μb/sr	L (d,p)	σ (d,p) μb/sr	S' (d,p)	S' (d,p)	S' (d,p)	$T_{1/2}$ or Γ_{cm}	Ref.
4418(10)	$3^+,5^+$			2	300			0.67		72Ma66
4466(10)	$1^-,3^-$			1	330	0.05		0.05		72Ma66
4517(10)					50					72Ma66
4545(10)					200					72Ma66
4571(10)					150					72Ma66
4607(10)										
4631(10)					⟨170⟩					72Ma66
4646(10)					⟨80⟩					72Ma66
4663(10)	$3^+,5^+$			2	550	0.14		0.14		72Ma66
4734(10)*					150					72Ma66
4739(10)	1^+			0	1410	0.08		0.13		72Ma66
4767				[2]				0.11		65Bo20
4784(10)*				⟨3⟩	410	0.25				72Ma66
4807					⟨90⟩					72Ma66
4854(10)	$3^+,5^+$			2	900	0.12		0.14		72Ma66
4869(10)				1	1460	0.08		0.3		72Ma66
4900(10)										
4950(10)										
4962(10)	$\langle 3^+,5^+\rangle$			⟨2⟩				0.19		65Bo20
5016(10)										
5049(10)										
5070(10)	$\langle 5^-,7^-\rangle$			⟨3⟩				0.28		65Bo20
5093(10)										
5118(10)										
5154(10)										
5157(10)										
5199(10)										
5245(10)										
5264(10)										
5295(10)										
5327(10)										
5352(10)										
5433(10)										
5455(10)										
5489(10)										
5515(10)										
5575(10)										
5615(10)										
5668(10)										
5719(10)										
5750(10)										
5806(10)										
5820(10)										
5858(10)										
5885(10)										

(continued) $^{55}_{24}$Cr

E^* [keV]	$2J^\pi$	L (t,p)	σ (t,p) μb/sr	L (d,p)	σ (d,p) μb/sr	S' (d,p)	S' (d,p)	S' (d,p)	$T_{1/2}$ or Γ_{cm}	Ref.
5956(10)										
5980(10)										
6000(10)										
6068(10)										
6136(10)										
6164(10)										
6306(10)										
6556(10)										
6583(10)										
6644(10)										
			72Ma66		72Ma66	72Ma66	80Ta05	65Bo20		Ref.

Additional data on this isotope can be found in [03Ap01, 64Bo08].

* In data from [72Ma66] values E^* were decreased by 23 keV and values $(2J+1)S$ were renormalized [91Hu07].

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

Energy levels and branching ratios [91Hu07]. Part 2 $^{55}_{24}$Cr

E^*	$2J^\pi$		Branching ratios in percentage						
		E_f^*:	0.0	242	518	566	881	1215	1439
[keV]		$2J_f^\pi$:	3^-	1^-	5^-	3^-	5^-	5^-	$\langle 9\rangle^-$
241.91(4)	1^-		100						
517.70(4)	5^-		100						
565.91(3)	3^-		88(9)	12(1)					
880.71(4)	5^-		88(1)		7.0(4)	4.9(4)			
1131(10)					100				
1214.75(5)	5^-		65(6)		8(4)		27(5)		
1438.82(7)	$\langle 9\rangle^-$				82(3)			18(2)	
1474.20(6)	1^-		44(5)	5.6(6)		50(5)			
1479.03(12)	$\langle 7^-\rangle$				100				
2083.85(13)	3^-		63(7)	37(4)					
2086.10(12)	9^+							42(5)	
2269.24(18)	1^+		50(6)			50(6)			
2390.40(12)	$\langle 11\rangle$								100
2686.99(14)	1^-,3^-		59(6)	20(2)		21(2)			
2755.49(15)	$\langle 13^-\rangle$								67(5)
2894.54(13)	1^-		52(5)	30(3)		18(2)			
4044.25(21)	1^+		78(8)			22(2)			

Energy levels and branching ratios [91Hu07]. Part 3 **$^{55}_{24}$Cr**

E^*	$2J^\pi$			Branching ratios in percentage			
		E_f^*:	1479	2086	2390	2755	2880
[keV]		$2J_f^\pi$:	$\langle 7^- \rangle$	9^+	$\langle 11 \rangle$	$\langle 13^- \rangle$	$\langle 13^+ \rangle$
2086.10(12)	9^+		58(5)				
2755.49(15)	$\langle 13^- \rangle$				33(5)		
2880.36(13)	$\langle 13^+ \rangle$			65(3)	35(3)		
3306.22(20)	$\langle 15 \rangle$					100	
4005.4(2)	$\langle \geq 15 \rangle$						100

Energy levels and branching ratios [99Hu04]. **$^{56}_{24}$Cr**

E^*	J^π	L	σ (t,p)	N	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
							E_f^*: 0.0	1007	1832	2077	3252
[keV]		(t,p)	arb.u	(α,^{2}He)	Γ_{cm}		J_f^π: 0^+	2^+	2^+		
0.0	0^+	0	153	200(70)	5.94(10) m	90Fi07					
1006.61(20)	2^+	2	7.7		≥1.4 ps	68Ch20	100				
1674.5	$\langle 0^+ \rangle$					03Ma02					
1831.6(4)	2^+	2	3.7			68Ch20	15(5)	85(5)			
2076.6(3)	4^+				≤2.8 ps	01Pr05		100			
2326.8(20)	2^+	2	14.7		≤0.06 ps	68Ch20	<5.6	100	<5.6		
2681.7(11)	4^+	4	3.9		≥0.7 ps	68Ch20			100		
3165(6)			6.0		≤0.2 ps	68Ch20		100			
3252.0(6)					≥0.7 ps					100	
3402(20)			0.8			68Ch20					
3451(15)	3^-	3	5.0			68Ch20					
3509(15)	2^+	2	7.1			68Ch20					
3648(15)			5.0			68Ch20					
3675(20)			5.0			68Ch20					
3794(15)	3^-	3	3.5			68Ch20					
3819(15)			1.9			68Ch20					
3897(15)	0^+	0	6.0			68Ch20					
3916(20)			0.4			68Ch20					
4014(15)			4.8			68Ch20					
4112(15)			3.0			68Ch20					
4175(15)			7.6			68Ch20					
4247(20)			0.9			68Ch20					
4284(15)			2.6			68Ch20					
4349(15)			4.2			68Ch20					
4448.9(6)	$[7^-]$		5.8	35(10)	≥0.7 ps	90Fi07					100
4631(15)			2.8			68Ch20					
4678(15)			3.2			68Ch20					
4800(20)			1.4			68Ch20					
4848(15)			1.8			68Ch20					
4892(15)			4.0			68Ch20					
4924(15)			incl			68Ch20					

(continued) **$^{56}_{24}$Cr**

E^*	J^π	L	σ (t,p)	N	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
							E^*_f:	0.0	1007	1832	2077	3252
[keV]		(t,p)	arb.u	(α,^{2}He)	Γ_{cm}		J^π_f:	0^+	2^+	2^+		
4989(15)			1.8			68Ch20						
5060	$[5^-]$			85(30)		90Fi07						
5121(15)	$\langle 3^- \rangle$		6.3			68Ch20						
5603.3(12)												
6150	$[5^-]$			100(40)		90Fi07						
7330	$[X^+]$			≈60		90Fi07						
			68Ch20	90Fi07		Ref.						

Additional data on this isotope can be found in [03Ap01, 01Pr13].
Parameter N=$(d\sigma/d\Omega$ (exp))/$(d\sigma/d\Omega$ (DWBA)) has a meaning of S_N in the case of two neutron transfer reaction (α,^{2}He).

Energy levels and branching ratios [99Hu04]. Part 2 **$^{56}_{24}$Cr**

E^*	J^π	Branching ratios in percentage	
		E^*_f:	4449
[keV]		J^π_f:	
5603.3(12)			100

Energy levels [98Bh11, 03Ma02]. **$^{57}_{24}$Cr**

E^*	$2J^\pi$	$T_{1/2}$ or
[keV]		Γ_{cm}
0.0	$\langle 3^- \rangle$	21.1(10) s
267.8		
692.7		
941.9		
1583		

Energy levels [97Bh02]. $^{58}_{24}\mathbf{Cr}$

E^* [keV]	J^π	$T_{1/2}$ or Γ_{cm}	Ref.
0.0	0^+	7.0(3) s	
880	$\langle 2^+ \rangle$		01Pr05

Additional data on this isotope can be found in [03Ma02, 01Pr13, 01Pr05].