Energy levels and branching ratios [90En08, 98En04]. **$^{28}_{15}$P**

E^*	J^π	σ (τ,t)	$T_{1/2}$ or	Ref.	Branching ratios in percentage			
					E_f^*:	0	105.64	877
[keV]		μb/sr	Γ_{cm}		J_f^π:	3^+	2^+	
0	3^+	47(3)	270.3(5) ms	91Ja04				
105.64(10)	2^+	39(3)		91Ja04		100		
877(2)							100	
1134.0(5)	3^+	42(3)	<1.0 ps	91Ja04		60(11)	40(11)	
1313(2)	1^+	209(6)		91Ja04			46(22)	54(22)
1516(2)	2^+					100		
1568(3)	1^+	167(6)		91Ja04			100	
2104(1)	2^+		<85 ps			40(11)	60(11)	<9
2143(5)	1^+	688(12)		91Ja04				
2216(5)	$\langle 4^+ \rangle$							
2406(5)	$\langle 0\text{–}2 \rangle^+$							
2483(5)								
2628(5)	$\langle 4^+ \rangle$							
2857(5)								
2896(5)	$\langle 3,4 \rangle^+$							
2973(5)	1^+	88(4)		91Ja04				
3063(25)		140(6)		91Ja04				
3164(5)	3^+							
3200(5)								
3250(5)								
3512(5)	1^+							
3558(5)								
3728(5)								
3806(5)								
3911(5)	$2^+,1^+$	102(5)		91Ja04				
4150(10)								
4180(10)								
4290(10)								
4500								
4630(10)	1^+	232(16)		91Ja04				
4940(10)	6^-							
4970(10)								
5190(10)								
5900(21)	0^+	113(6)		91Ja04				
		91Ja04		Ref.				

Additional data on this isotope can be found in [97Vo01].

Zero-degree cross section σ (τ,t) was measured at the energy of 200 MeV [91Ja04].

Energy levels and branching ratios [90En08, 98En04]. **$^{29}_{15}$P**

E^* [keV]	$2J^\pi$	$2T$	ℓ_p	C^2S (τ,d)	S'^+_p eval	C^2S (τ,d)	C^2S (τ,d)	σ (τ,t) μb/sr	Ref.
0	1^+		0	0.59	0.55	0.65	0.54	383	91Ja04
1383.6(1)	3^+		2	0.82	1.0	0.88	0.78	110	91Ja04
1953.9(2)	5^+		2	0.12	0.19	0.12	0.10		94Ve02
2422.7(3)	3^+		2			0.035	0.06	152	90En08
3105.9(3)	5^+		2			0.06			90En08
3447.6(4)	7^-		3			0.50	0.57	114	90En08
4080.5(3)	7^+		$\langle 4 \rangle$			0.001			90En08
4343(2)	3^-		1			0.64	0.33		90En08
4642(1)	$\langle 7,9 \rangle^+$								
4759(3)	1^+					0.06		643	91Ja04
4954(1)	5^+								
5047(3)	$\langle 7,9 \rangle^+$								
5293(1)	7^+								
5527(20)	1^-								
5583(4)									
5716(4)									
5740(3)	7^-		3			0.23	0.15		90En08
5826(4)	$\langle 3–7 \rangle^+$								
5968(3)	3^+		2			0.05	0.04		90En08
6074(15)	$\langle 3–7 \rangle$								
6191(5)	3^-								
6328(5)	3^+		2			0.024	0.03		90En08
6505(15)	$\langle 3–7 \rangle^+$								
6577(5)	1^+								
6828(5)	3^+		2						
6956(10)	1^+								
7021(5)	3^-								
7148(10)	$\langle 3–7 \rangle^+$								
7272(5)	5^+								
7361(10)	$\langle 3–7 \rangle^+$								
7456(5)	$7^-,\langle 5^- \rangle$								
7523(5)	3^+								
7641(40)	1^+								
7755(5)	5^+								
7950(15)	$\langle 1,3 \rangle^-$								00ChZW
7998(30)	3^-								00ChZW
8105(11)	5^+								00ChZW
8234(9)	3^+								00ChZW
8297(15)	$1^-,\langle 3^- \rangle$								
8379(3)	5^+	3							
8432(15)	5^+								
8510(10)	$\langle 1^+ \rangle$								
8532(10)	3^+								
8645(15)									
8693(30)	3^+								

(continued) **$^{29}_{15}$P**

E^* [keV]	$2J^\pi$	$2T$	ℓ_p	C^2S (τ,d)	S'^+_p eval	C^2S (τ,d)	C^2S (τ,d)	σ (τ,t) μb/sr	Ref.
8780(15)	1^+								
8810(30)	$\langle 3–7\rangle^+$								
8865(12)	3^+								
8915(15)	5^+								
9002(15)	$5^+,\langle 3^+\rangle$								
9079(15)	$\langle 1,3\rangle^-$								
9118(40)									
9301(15)									
9369(15)									
9389(12)	3^+								
9455(15)	1^+								
9548	1^+								
9625	1^+								
9660	$\langle 5,7\rangle^-$								
9743	1^+								
9760	$\langle 3,5\rangle^+$								
9773	$\langle 3,5\rangle^+$								
9815	$\langle 3,5\rangle^+$								
9855(30)	$\langle 3,5\rangle^+$								
10095(30)	$\langle 3–7\rangle^+$	$\langle 3\rangle$							
10490(2)	3^+								
10535(30)	$\langle 3^+7\rangle^+$	$\langle 3\rangle$							
11360(2)	5^+								
11480(2)	5^+								
				94Ve02		76Dy01		91Ja04	Ref.
					77En02		77Ko21		Ref.

Additional data on this isotope can be found in [00ChZW, 90Gr04, 75Pe05, 77Ko21, 66Bu07].

Values C^2S for proton transfer (τ,d) reaction from three experimental works [94Ve02, 76Dy01, 77Ko21] are given in separate columns for comparison with the evaluated values from [77En02].

Values C^2S were calculated in [90En08] from $G_{\ell j}=(2J_f+1)S$ in original works. Zero-degree cross section σ (τ,t) was measured at the energy of 200 MeV [91Ja04].

Energy levels and branching ratios [90En08, 98En04]. Part 2 **$^{29}_{15}$P**

E^* [keV]	$2J^\pi$	S' (τ,d)	S' (d,n)	$T_{1/2}$ or Γ_{cm}	Ref.	E^*_f: $2J^\pi_f$:	Branching ratios in percentage 0 1^+	1383 3^+	1954 5^+	2423 3^+
0	1^+	1.3	1.0(64)	4.142(15) s	91Ja04					
1383.6(1)	3^+	3.5	2.2(22)	166(21) fs	91Ja04		100			
1953.9(2)	5^+	0.74	0.54	277(28) fs	94Ve02		92(1)	8(1)		
2422.7(3)	3^+	0.14		19(3) fs	90En08		84(3)	12(2)	4(2)	
3105.9(3)	5^+	0.36		23(11) fs	90En08		<3.0	76(2)	24(2)	

(continued) **$^{29}_{15}$P**

E^* [keV]	$2J^\pi$	S' (τ,d)	S' (d,n)	$T_{1/2}$ or Γ_{cm}	Ref.	E_f^*: $2J_f^\pi$:	Branching ratios in percentage 0 1^+	1383 3^+	1954 5^+	2423 3^+
3447.6(4)	7^-	3.7	2.7(22)	9(6) fs	90En08				93(6)	
4080.5(3)	7^+	⟨0.15⟩		17(4) fs	90En08			44(3)	52(3)	4(2)
4343(2)	3^-	1.7	0.76	52(1) keV	90En08		91(2)	9(2)		
4642(1)	$\langle 7,9\rangle^+$			35(15) fs					87(7)	
4759(3)	1^+	0.06		16(1) keV	91Ja04		90(2)	5(2)	<1.0	5(2)
4954(1)	5^+			<3 fs			11(3)	59(3)	16(3)	11(3)
5047(3)	$\langle 7,9\rangle^+$									
5293(1)	7^+			<7 fs				<6.0	78(5)	
5527(20)	1^-			400(20) keV						
5583(4)										
5716(4)										
5740(3)	7^-	1.3		13(1) keV	90En08					
5826(4)	$\langle 3–7\rangle^+$									
5968(3)	3^+	0.2		9.5(15) keV	90En08					
6074(15)	$\langle 3–7\rangle$									
6191(5)	3^-			95(6) keV						
6328(5)	3^+	⟨0.42⟩		73(5) keV	90En08					
6505(15)	$\langle 3–7\rangle^+$									
6577(5)	1^+			200(20) keV						
6828(5)	3^+			4.9(4) keV						
6956(10)	1^+			120(10) keV						
7021(5)	3^-			100(8) keV						
7148(10)	$\langle 3–7\rangle^+$									
7272(5)	5^+			<3 keV						
7361(10)	$\langle 3–7\rangle^+$									
7456(5)	$7^-,\langle 5^-\rangle$			8.4(7) keV						
7523(5)	3^+			7(3) keV						
7641(40)	1^+			165(25) keV						
7755(5)	5^+			≈2 keV						
7950(15)	$\langle 1,3\rangle^-$			14(4) keV	00ChZW					
7998(30)	3^-			125(25) keV	00ChZW					
8105(11)	5^+			36(10) keV	00ChZW					
8234(9)	3^+			20(4) keV	00ChZW					
8297(15)	$1^-,\langle 3^-\rangle$			≈40 keV						
8379(3)	5^+			271(10) eV				12(2)	43(2)	25(2)
8432(15)	5^+									
8510(10)	$\langle 1^+\rangle$									
8532(10)	3^+			25(7) keV						
8645(15)				≈10 keV						
8693(30)	3^+			120(30) keV						
8780(15)	1^+			14(3) keV						
8810(30)	$\langle 3–7\rangle^+$									
8865(12)	3^+			9(3) keV						
8915(15)	5^+			33(6) keV						
9002(15)	$5^+,\langle 3^+\rangle$			≈50 keV						

(continued) **$^{29}_{15}$P**

E^*	$2J^\pi$	S'	S'	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
						E_f^*:	0	1383	1954	2423
[keV]		(τ,d)	(d,n)	Γ_{cm}		$2J_f^\pi$:	1^+	3^+	5^+	3^+
9079(15)	$\langle 1,3\rangle^-$			23(5) keV						
9118(40)				≈150 keV						
9301(15)				7(3) keV						
9369(15)										
9389(12)	3^+			13(5) keV						
9455(15)	1^+			20(5) keV						
9548	1^+			50(10) keV						
9625	1^+			40(10) keV						
9660	$\langle 5,7\rangle^-$			3.07(5) keV						
9743	1^+			7(3) keV						
9760	$\langle 3,5\rangle^+$			8(3) keV						
9773	$\langle 3,5\rangle^+$			8(3) keV						
9815	$\langle 3,5\rangle^+$			20(10) keV						
9855(30)	$\langle 3,5\rangle^+$			12(5) keV						
10095(30)	$\langle 3–7\rangle^+$									
10490(2)	3^+			0.88(17) keV						
10535(30)	$\langle 3^+7\rangle^+$									
11360(2)	5^+			3.5(5) keV						
11480(2)	5^+			1.53(12) keV						
		76Dy01		00ChZW	Ref.					
			76Dy01		Ref.					

Energy levels and branching ratios [90En08, 98En04]. Part 3 **$^{29}_{15}$P**

E^*	$2J^\pi$		Branching ratios in percentage		
		E_f^*:	3106	4081	4954
[keV]		$2J_f^\pi$:	5^+	7^+	5^+
3447.6(4)	7^-		7(6)		
4642(1)	$\langle 7,9\rangle^+$		<4.0	13(7)	
4954(1)	5^+		3.0(10)		
5293(1)	7^+		22(5)		
8379(3)	5^+				20(11)

Energy levels and branching ratios [90En08, 98En04]. **$^{30}_{15}$P**

E^* [keV]	J^π	T	ℓ	$S_p'^+$ eval	C^2S (τ,d)	$G_{\ell j}$ (τ,d)	$G_{\ell j}$ (d,n)	$G_{\ell j}$ (τ,d)	S_n^- eval	σ (τ,t) μb/sr	σ (α,d) μb/sr	σ (τ,p) arb.u	$T_{1/2}$ or Γ_{cm}	Ref.
0	1^+		0	1.0(2)		0.74	0.71	0.72	0.7(1)	268(42)	32	320	2.50(1) m	91Ja04
			+2	small					0.13(4)					77En02
677.29(7)	0^+	1				0.23	0.23	0.25		1490(130)		650	94(8) fs	91Ja04
709.02(6)	1^+		0	0.12(3)		0.09	incl	0.09	0.11(3)		14	incl	34(1) ps	77En02
			+2	0.6(2)		0.45		0.35	0.5(1)					77En02
1454.67(7)	2^+		2	0.7(1)	0.39	0.81	0.84	0.81	0.5(1)		13	95	4.5(6) ps	94Ve02
1973.62(11)	3^+		2	0.08(4)		0.12	0.21	0.07	0.8(1)		60	380	1.9(6) ps	77En02
			+4			0.21								
2539.03(11)	3^+		2	0.10(2)		0.09	0.18	0.11	0.7(1)		35	260	140(15) fs	77En02
			+4			0.23								
2723.96(10)	2^+		2	0.10(2)		0.10	0.15	0.10	0.49(9)				109(9) fs	77En02
2839.9(2)	3^+		2	small		0.04			small		30		500(70) fs	77En02
2937.87(6)	2^+	1			0.40	0.80	0.70	0.83				200	61(4) fs	94Ve02
3019.39(11)	1^+		0	0.14(3)		0.08	0.10	0.12	0.07(2)	910(80)		400	2(1) fs	91Ja04
			+2	0.08(2)		0.11	0.068	0.05	0.12(3)					77En02
3733.9(3)	1^+		0			0.03	0.03	0.06					22(4) fs	76Dy01
			+2			0.08	0.11	0.02						76Dy01
3835.9(2)	2^+		2	0.13(2)		0.11	0.19	0.14	0.4(1)				34(3) fs	77En02
			+4			0.11								
3928.9(3)	3^+					0.005	0.12					180	70(10) fs	76De24
4143.67(14)	2^-		1	0.16(6)		0.14	0.13	0.26	0.01(1)		55	1300	29(2) fs	77En02
4182.65(8)	2^+	1	2			0.20		0.15					2.2(5) fs	76Dy01
4232.2(4)	4^-		3	0.44(8)		1.10	0.97	1.35	0.12(3)		100	800	550(140) fs	77En02
4298.1(10)	4^+					0.005							95(15) fs	76Dy01
4343.6(5)	5^+										15		105(15) fs	76De24
4422.4(3)	2^+					0.01		0.13					37(4) fs	76Dy01
4468.33(7)	0^+	1	0			0.11	0.058	0.19					1.9(3) fs	76Dy01
4502.32(12)	1^+	1	2			0.47	0.32	0.40					4.0(12) fs	76Dy01
4626.55(14)	3^-		3	0.35(6)		0.54	0.56	0.65	0.05(2)			150	180(14) fs	77En02
4736.4(2)	3^+		2			0.01							51(6) fs	76Dy01
4926.4(2)	5^-		3	0.09(7)		0.02	0.28	0.04	0.05(2)		50	160	260(35) ps	77En02
4937.9(3)	1					incl							4.6(14) fs	
4941.0(3)	1^+									273(48)			4.3(11) fs	91Ja04
5028(3)	5^-					0.002								76Dy01
5206.6(4)	3^+												17(4) fs	
5231.6(5)	4^-					0.01								76Dy01
5411.1(5)	0^-		1			0.07	0.063	0.45				260		76De24
5506.1(2)	1	0	0			0.03							3.8(9) fs	76Dy01
			+2			0.05	0.19	0.08						76Dy01
5508.6(4)	$\langle 2,3\rangle$	1				incl	incl						10(5) fs	
5576(2)	2^+	1				0.07							6(1) fs	76Dy01
5595(3)	4^+					0.09		0.11						76Dy01
5701.7(4)	1^+	0				weak							11(3) fs	76Dy01
5714(3)	$\langle 5,7\rangle^+$													
5808(3)	$\langle 3,5\rangle^+$					0.03								76Dy01

(continued) **$^{30}_{15}$P**

E^* [keV]	J^π	T	ℓ	S'^+_p eval	C^2S (τ,d)	$G_{\ell j}$ (τ,d)	$G_{\ell j}$ (d,n)	$G_{\ell j}$ (τ,d)	S^-_n eval	σ (τ,t) μb/sr	σ (α,d) μb/sr	σ (τ,p) arb.u	$T_{1/2}$ or Γ_{cm}	Ref.
5890(12)	1^+–3^+	1												
5907.7(8)	2^-		1			0.35		0.50						76Dy01
5934.0(5)														
5993(4)	$\langle 0$–$2\rangle^-$		1			0.33		0.29						76Dy01
5997.1(8)	1^+	0+1												
6006.0(5)														
6050(10)	$\langle 0,1\rangle^+$	1												
6051(5)	$\langle 3$–$5\rangle^+$													
6094.6(5)	3^-	1	[4]			0.59						1200	4.4(10) fs	76De24
6181(4)	$\langle 5$–$7\rangle^+$													
6229.0(5)	$\langle 3,5\rangle^+$		[0]			0.03								76Dy01
6269.6(8)	$\langle 1^+,2\rangle$	1	1			0.06								76Dy01
6295(5)														
6299.3(6)	3^+	0												
6361(9)	$\langle 4$–$6\rangle^-$													
6468(3)	$\langle 5^+,6^-\rangle$										30	400		76De24
6481.4(6)	1^+	0	0			0.05								76Dy01
6519.4(6)	$\langle 1,2\rangle^+$		2			0.04								76Dy01
6597.7(5)	$\langle 3,5\rangle^+$					0.05								76Dy01
6656(5)			[3]			0.04								76Dy01
6667.8(5)	$\langle 2^-,3^+\rangle$					0.04						2000		76De24
6791(5)			[0]			0.04								76Dy01
6853.9(5)	1^+	0	[2]			0.05						700	25(3) eV	76De24
6873.4(5)	3^+											incl	3 eV	
6877(1)	2^-		1			0.34							3.1(3) keV	76Dy01
6921(1)	1^-	0	1			0.23							5.4(5) keV	76Dy01
6978.3(5)	$\langle 3,4\rangle^+$													
7014.9(5)	2^-	0	1			0.05							700(70) eV	76Dy01
7045.0(5)	$\langle 2$–$4\rangle^-$	0				0.95						300	20(2) eV	76De24
7049.5(5)	4^-	1				incl							45(5) eV	
7119.1(5)	$\langle 1^+$–$3^+\rangle$													
7178(3)	1^-	1	1			0.17						500	15.0(15) keV	76De24
7199.1(5)	7^+		[2]			0.18						incl	9.4(12) ps	76Dy01
7203.0(5)	2^+	0				incl							30(3) eV	
7207.5(5)	0^+	1				incl							160(20) eV	
7223(1)	2^-	1	1			0.15							4.5(5) keV	76Dy01
7282.0(5)	3^-	0				0.06							1 eV	76Dy01
7283.4(5)	2^+	1				incl							7(1) eV	
7304.9(5)	2^-	0				$\langle 0.05\rangle$							60(6) eV	76Dy01
7306.3(5)	2^-	0				0.21							45(5) eV	76Dy01
7322(3)	1^-		1			0.12							16.5(17) keV	76Dy01
7347(5)	$\langle 5$–$7\rangle^+$													
7370(5)														
7383.4(5)	$\langle 1$–$3^+\rangle$					0.05								76Dy01
7493(1)	1^+	0	2			0.33							3.5(4) keV	76Dy01

(continued) **$^{30}_{15}$P**

E^* [keV]	J^π	T ℓ	S'^+_p eval	C^2S (τ,d)	$G_{\ell j}$ (τ,d)	$G_{\ell j}$ (d,n)	$G_{\ell j}$ (τ,d)	S^-_n eval	σ (τ,t) μb/sr	σ (α,d) μb/sr	σ (τ,p) arb.u	$T_{1/2}$ or Γ_{cm}	Ref.
7560.5(5)	3^+	0			0.04							40(4) eV	76Dy01
7562.6(5)	2^+	1			incl								
7579.9(5)	2^-	0			0.21							170(20) eV	76Dy01
7605.0(5)	$\langle 1,2\rangle^+$	0			incl							280(30) eV	
7636.0(5)	3^+	1			obsc						820	<3 eV	76De24
7644.3(5)	3^+	1			obsc							65(7) eV	
7647(5)	$\langle 4–6\rangle^-$												
7688.2(5)	5^+				$\langle 0.05\rangle$							<3 eV	76Dy01
7742(3)	1^-											52(5) keV	
7749.3(5)	1^+	0										570(60) eV	
7752.7(5)	$\langle 3,4\rangle^+$				$\langle 0.06\rangle$							<3 eV	76Dy01
7759.0(5)	3^+	1			$\langle 0.10\rangle$							<4 eV	76Dy01
7786.4(5)	$\langle 2–4\rangle^-$											17(2) eV	
7803(3)	$\langle 2–4\rangle^-$											10(1) eV	
7826.3(5)	2^-	0										400(40) eV	
7873.7(5)	4^-											20(2) eV	
7883.8(5)	$\langle 3,4\rangle^+$				0.10								76Dy01
7892(3)	2^-											70(7) eV	
7920.9(5)	2^+				0.18							400(40) eV	76Dy01
7921.8(5)	3^+	0			incl								
7922(1)	$\langle 3,4\rangle^+$				incl								
7931(3)	0^+				incl						2000	28(3) keV	76De24
7996.7(5)	0^+	1									incl	1.0(1) keV	
8001(3)	1^-	0									incl	4.8(5) keV	
8007.4(5)	$\langle 1,2\rangle^+$	0										650(70) eV	
8014.3(5)	2^+	0										270(30) eV	
8032(3)	2^-											2.7(3) keV	
8053(3)													
8095(3)	1^+											7.4(17) keV	
8106(3)	2^+				$\langle 0.07\rangle$							880(90) eV	76Dy01
8151(3)													
8165(3)	1^-											1.9(2) keV	
8180(3)	1^+											18(2) keV	
8187(3)	3^-											1.3(1) keV	
8206(3)	4^-				$\langle 0.05\rangle$							50(8) eV	76Dy01
8207(3)	0^+											13(2) keV	
8209(3)	0^-											30(5) keV	
8242(10)	$\langle 4–6\rangle^-$												
8271(3)													
8276(3)	2^-											390(60) eV	
8278(3)	2^+	1			$\langle 0.06\rangle$							1.4(2) keV	76Dy01
8319(3)	1^+											8.7(13) keV	
8350(3)	4^-				$\langle 0.06\rangle$							180(30) eV	76Dy01
8351(3)					incl								
8352(3)	2^-				incl							3.4(5) keV	

(continued) **$^{30}_{15}$P**

E^*	J^π	ℓ	S'^+_p	C^2S	$G_{\ell j}$	$G_{\ell j}$	$G_{\ell j}$	S^-_n	σ (τ,t)	σ (α,d)	σ (τ,p)	$T_{1/2}$ or	Ref.
[keV]			eval	(τ,d)	(τ,d)	(d,n)	(τ,d)	eval	μb/sr	μb/sr	arb.u	Γ_{cm}	
8386(3)	3^+											120(20) eV	
8398(3)	2^+											760(110) eV	
8409(3)	3^-											145(20) eV	
8426(3)													
8432(3)	2^+											1.7(3) keV	
8451(3)	1^+											2.9(5) keV	
8484(3)	4^-											170(30) eV	
8497(3)	1^-											39(6) keV	
8519(3)	0^-											200(30) keV	
8526(10)	$\langle 3\text{–}5\rangle^+$												
8530													
8557(3)	1^-											29(4) keV	
8582(3)	2^+											1.0(2) keV	
8619(3)	2^+											1.9(3) keV	
8621(3)	1^+				0.22							13(2) keV	76Dy01
8632(3)	4^-				incl							530(80) eV	
8642(3)	3^-											1.3(2) keV	
8647(3)	3^+											150(20) eV	
8662(3)	2^-											6.6(10) keV	
8669(3)	2^-											2.2(3) keV	
8708(3)	1^+											42(6) keV	
8730(3)	4^-											310(50) eV	
8755(3)	$\langle 1^+\rangle$											33(5) keV	
			77En02			74Uz01		77En02	91Ja04	76De24	76De24		Ref.
				94Ve04	76Dy01		74He04						Ref.

Additional data on this isotope can be found in [97Va02, 97ShZY, 96Wa33, 76Co19, 74Ha38, 70Gr30,].

Values S'^+_p and S^-_n are from evaluation by P.Endt [77En02], values C^2S are from [94Ve02].

Zero-degree cross section σ (τ,t) was measured at the energy 200 MeV [91Ja04].

Measured experimentally quantities $G_{\ell j}=(2J_f+1)(2J_i+1)^{-1}C^2S$ from one-proton transfer reactions (τ,d) [76Dy01, 74He04] and (d,n) [74Uz01] are given together in the center. Zero-degree cross section σ (τ,t) was measured at the energy 200 MeV [91Ja04].

Cross sections of two-nucleon transfer reactions (α,d) and (τ,p) [76De24] are given at right.

Energy levels and branching ratios [90En08, 98En04]. Part 2 **$^{30}_{15}$P**

E^*	J^π		Branching ratios in percentage									
		E^*_f:	0	677	709	1454.7	1973.6	2539.0	2724.0	2839.9	2937.9	3019.4
[keV]		J^π_f:	1^+	0^+	1^+	2^+	3^+	3^+	2^+	3^+	2^+	1^+
677.29(7)	0^+		100									
709.02(6)	1^+		99.9	0.13(2)								
1454.67(7)	2^+		95.6(4)	<0.2	4.4(4)							

(continued) **$^{30}_{15}$P**

E^*	J^π		Branching ratios in percentage									
		E_f^*:	0	677	709	1454.7	1973.6	2539.0	2724.0	2839.9	2937.9	3019.4
[keV]		J_f^π:	1^+	0^+	1^+	2^+	3^+	3^+	2^+	3^+	2^+	1^+
1973.62(11)	3^+		45.0(3)	<0.3	55.0(3)	<4.0						
2539.03(11)	3^+		96.6(6)	<0.4	3.0(2)	<0.4	0.40(11)					
2723.96(10)	2^+		97.3(5)	<0.6	2.7(5)	<0.2	<0.1					
2839.9(2)	3^+		18(2)	<0.6	53(2)	29(2)						
2937.87(6)	2^+		18.0(3)	31.8(5)	5.8(2)	43.8(6)	0.6(2)					
3019.39(11)	1^+		<1	100	<0.7	<0.2						
3733.9(3)	1^+		52(4)	29(3)		11(2)	<3.0	<2.0			8(2)	
3835.9(2)	2^+		<2.0	<5.0	22(2)	9.3(11)					68.6(12)	
3928.9(3)	3^+			<7.0	<3.0	22(3)					78(3)	
4143.67(14)	2^-		85(3)	<0.9	5(1)	8.2(14)	<0.9	<1			1.9(3)	
4182.65(8)	2^+		11.6(8)	1.2(2)	75(2)	3.2(8)	4.2(8)	4.6(8)				
4232.2(4)	4^-		2.5(5)	<0.1		<0.2	68.5(10)	25.9(5)		3.1(5)		
4298.1(10)	4^+					81(6)		19(6)				
4343.6(5)	5^+						95(2)	5(2)				
4422.4(3)	2^+		96(2)		4(2)	<3.0	<0.8	<0.7				
4468.33(7)	0^+		92(1)	<1	8.2(14)	<1	<0.5	<0.2				
4502.32(12)	1^+		41(3)	<2.0	4.0(7)	55(3)		<3.9			<2.0	
4626.55(14)	3^-			<0.8	<0.8	61(2)	14.4(11)	<1.0			25(2)	
4736.4(2)	3^+		9.9(7)		6.9(6)	13(2)					68.1(17)	2.1(7)
4926.4(2)	5^-		<0.5			11.3(10)						
4937.9(3)	1			84(4)							16(5)	
4941.0(3)	1^+			93.5(10)			7(1)					
5206.6(4)	3^+		76(3)		24(3)							
5231.6(5)	4^-						55(5)	28(5)		17(5)		
5506.1(2)	1		2.0(6)	97(1)							2.0(6)	
5508.6(4)	⟨2,3⟩					60(10)	40(10)					
5576(2)	2^+		13(1)		39(3)	15(1)						
5701.7(4)	1^+							10(2)	4.0(15)		70(4)	
6094.6(5)	3^-								2.0(5)		5(2)	

Energy levels and branching ratios [90En08, 98En04]. Part 3 **$^{30}_{15}$P**

E^*	J^π		Branching ratios in percentage							
		E_f^*:	3733.9	3835.9	4143.7	4182.6	4232.2	4343.6	4626.5	4926.4
[keV]		J_f^π:	1^+	2^+	2^-	2^+	4^-	5^+	3^-	5^-
4926.4(2)	5^-						88.7(10)			
5576(2)	2^+		18(2)	15(2)						
5701.7(4)	1^+					16(4)				
6094.6(5)	3^-				9(3)		29(5)		55(5)	
6468(3)	⟨5^+,6^-⟩						74.0	12.00		14.00
7199.1(5)	7^+							100		

Energy levels and branching ratios [90En08, 98En04]. **$^{31}_{15}$P**

E^*	$2J^\pi$	$2T$	S'^+_p	C^2S	C^2S	C^2S	ℓ_p	C^2S	C^2S'	C^2S'	S^-_p	C^2S	ℓ_p	σ (p,α)	S_N	Ref.
[keV]			eval	(τ,d)	(τ,d)	(τ,d)		(d,n)	(d,n)	(τ,d)	eval	(d,τ)		μb	*rel.*	
0	1^+		0.75(8)	0.65	0.34	0.64	0	0.53	1.05	0.97	2.0(2)	0.93	0	86(13)	1.0	94Ve02
1266.2(1)	3^+		1.0(1)	0.68	0.36	0.69	2	0.56	2.24	2.6	1.5(2)	0.98	2			94Ve02
2233.7(2)	5^+		0.10(2)	0.06	0.05	0.06	2	0.04	0.22	0.49	4.2(4)	1.84	2			94Ve02
3134.1(3)	1^+		0.04(2)			0.03	0	0.01	0.02	0.06	0.25(4)	0.11	0			77En02
3295.0(2)	5^+		<0.01			<0.001	⟨2⟩				1.2(2)	0.67	2	121(12)	1.0	77En02
3414.6(3)	7^+															
3505.8(5)	3^+		<0.01			0.006	⟨2⟩				small					77En02
4190.3(4)	5^+		0.03(2)			0.03	2				1.2(2)	0.65	2			77En02
4260.7(7)	3^+		0.06(2)			0.005	2			0.25						77En02
4430.9(3)	7^-		0.45(7)		0.24	0.30	3	0.26	2.09	2.9	⟨0.08⟩	0.04	⟨3⟩			77En02
4593.6(8)	3^+					0.03	2			0.24						90Ve04
4633.8(5)	7^+															
4783.1(5)	5^+					<0.001	⟨2⟩					0.20	2	290(14)	2.5	90Ve04
5014.9(10)	3								0.61	0.96						
5015.2(8)	1				0.16	0.17	1	0.15								
5115.4(6)	5^+					<0.001	⟨2⟩									90Ve04
5256.1(14)	1^+					0.05	0	0.02	0.04	0.10		0.10	0			90Ve04
5343.1(5)	9^+															
5529.3(8)	7^+,⟨5^+⟩															
5559.2(11)	3^+					0.02	2									90Ve04
5672.3(9)	5															
5773.1(8)	⟨5,7^+⟩															
5892.3(6)	9^+															
5987.9(12)	⟨3,5⟩$^+$					0.007	2					0.15	2			90Ve04
6047.8(10)	7^+											0.14				
6080.1(14)	9^+															
6233.1(13)	⟨3^+–9^+⟩															
6336.6(15)	1^+					0.004	0					0.11	0			90Ve04
6380.8(17)	3^+	3			0.33	0.22	2	0.12	0.49	1.0						
6398.6(7)	⟨5^-,7⟩															
6453.7(11)	11^+															
6460.8(16)	5^+					0.04	2									90Ve04
6495.8(12)	3^-					0.05	1	0.03	0.12	0.29						90Ve04
6500.6(9)	9^-															
6594.2(14)	5^-					0.03	3	0.04	0.21							90Ve04
6610.3(10)	3^-					0.02	1	0.01	0.03	0.15						90Ve04
6792.9(9)	9^-															
6825.1(9)	11^-															
6842.3(12)	⟨5,7⟩$^-$					0.005	3									90Ve04
6909.2(14)	3^-					0.02	1	0.02	0.08							90Ve04
6931.7(14)	5^+					0.02	2									90Ve04
7068(4)	⟨5,7⟩$^-$					0.005	3									90Ve04
7079.9(14)	⟨3^-,5^+⟩															
7084.0(17)	⟨3^+–7^+⟩															
7117.9(7)	$9^{\langle+\rangle}$															

(continued) **$^{31}_{15}$P**

E^* [keV]	$2J^\pi$	$2T$	S'^+_p eval	C^2S (τ,d)	C^2S (τ,d)	C^2S (τ,d)	ℓ_p	C^2S (d,n)	C^2S' (d,n)	C^2S' (τ,d)	Γ_p [eV]	γ^2_p [keV]	C^2S (p,p)	ℓ_p	σ (p,α) μb	S_N *rel.*	Ref.
7140.6(15)	1^+	3				0.11	0	0.04	0.07	0.68							90Ve04
7214(2)	$\langle 1,3\rangle^-$					0.008	1		0.03						204(15)	3.51	90Ve04
7313.7(16)	$\langle 1,3\rangle^+$					0.002	3										90Ve04
7314.4(4)	$\langle 5,7\rangle^-$																
7349(5)	$\langle 3,5\rangle^-$																
7441.2(7)	11^+																
7466(2)	$\langle 7,9\rangle^-$																
7687(2)																	
7715(5)																	
7736(4)	$\langle 5,7\rangle^-$					0.02	3										90Ve04
7779.3(10)	3^-					0.005	1										90Ve04
7825(12)																	
7852(3)	$\langle 1\text{–}5^+\rangle$																
7896.8(12)	1^-					0.08	1	0.11	0.22								90Ve04
7913(4)	$\langle 5,7\rangle^-$					0.03	3										90Ve04
7945.5(10)	3^+					0.01	2										90Ve04
7994(6)	$\langle 1\text{–}5\rangle^-$					0.008	2								177(13)	3.07	90Ve04
8032.2(9)	5																
8048.7(10)	3^-					0.01	1	0.01	0.04								90Ve04
8085(11)																	
8104.7(13)	5^+					0.003	2										90Ve04
8208.0(6)	3^+																
8224.7(6)	7																
8243.0(6)	5^-					0.02	3										90Ve04
8247.1(6)	3^-					0.01	1		0.04								90Ve04
8345.5(15)	$\langle 7^-,9^+\rangle$																
8355.6(6)	5^-					0.006	3										90Ve04
8433.8(7)	7^-					0.005	3										
8460.9(7)	5^+					0.004	2				2(1)	0.93	0.002				90Ve04
8470.2(7)	5																
8543.5(8)	1^-										54(10)	19.2	0.003				90Ve04
8552.1(8)	1^+					0.02	0	0.02			313(35)	51.8	0.006				90Ve04
8555.3(8)	3^-					0.01			0.06		210(25)	21.4	0.010				90Ve04
8575.5(8)	5^+										7(5)	1.74	0.004				90Ve04
8584.0(8)	1^-										50(10)	22.9	0.002				90Ve04
8600.8(8)	5^+																
8641.1(8)	5^+					0.004	2				5(3)	2.38	0.002				90Ve04
8649.3(8)	3^+																
8728.9(8)	$3^{\langle+\rangle}$																
8730.4(8)	3																
8737.8(8)	3^+	3				0.020	2				20(5)	3.04	0.007				90Ve04
8754.1(8)																	
8757.2(8)	5^+										3(2)	3.97	0.001				90Ve04
8763.2(9)	1^+										1450(150)	109	0.013				90Ve04
8839.8(9)	5^+					0.004	2				1(1)	0.36	0.003				90Ve04

(continued) **$^{31}_{15}$P**

E^* [keV]	$2J^\pi$	$2T$	S'^+_p eval	C^2S (τ,d)	C^2S (τ,d)	ℓ_p	C^2S (d,n)	C^2S' (d,n)	C^2S' (τ,d)	Γ_p [eV]	γ^2_p [keV]	C^2S (p,p)	ℓ_p	σ (p,α) μb	S_N *rel.*	Ref.
8902.8(10)	1^+									90(15)	162	0.001				90Ve04
8909.6(10)	5^+									1(1)	7.16	<0.001				90Ve04
8935.7(10)	3^+									3(2)	6.54	0.001				90Ve04
8985.7(10)	3															
9008.9(11)	5^+									65(20)	10.1	0.006				90Ve04
9046.0(11)	3^-									9300(940)	110	0.085				90Ve04
9052.6(11)	$\langle 3,5\rangle^+$															
9067.0(11)	5^+									16(5)	12.1	0.001				90Ve04
9113.4(6)	7^-									1(1)	1.07	0.001				90Ve04
9115.5(6)	5^+				0.008	2				22(7)	14.1	0.002				90Ve04
9128.5(6)	5^+									3(2)	14.7	<0.001				90Ve04
9130.9(6)	5^+									4(2)	14.7	<0.001				90Ve04
9154.2(6)	7^-				0.070	1										
9156.3(6)	3^+															
9176.0(6)	3^-									80(15)	150	<0.001				90Ve04
9206.1(6)	7^+															
9226.3(6)	1^-									4000(400)	162	0.025				90Ve04
9240.7(7)	3^+									150(15)	16.9	0.009				90Ve04
9252.9(7)	7^-									3(1)	1.72	0.002				90Ve04
9255.9(7)	7															
9290.8(7)	3^-				0.038	1				9800(1000)	193	0.051				90Ve04
9319.6(8)	1															
9358.2(8)	$\langle 7\rangle$															
9360.9(8)	$\langle 7\rangle$															
9362.4(8)	3^-				0.050	1				10000(1000)	223	0.045				90Ve04
9399.8(8)	1^+									500(75)	47	0.001				90Ve04
9412.5(8)	7^-	3		0.20	0.21	3	0.20			500(75)	2.79	0.179				90Ve04
9440.8(9)	3^+									180(20)	28.1	0.006				90Ve04
9448.9(9)	5^+				0.015	2				450(25)	33.9	0.013				90Ve04
9477.0(9)	7^-															
9524(3)	3^-				0.065	1				22000(2000)	302	0.073				90Ve04
9524.7(9)	$\langle 5,7^+\rangle$															
9534(3)	$\langle 3,5\rangle^+$									15(10)	35.1	<0.001				90Ve04
9536.5(10)	9^+															
9570.5(10)	3															
9577.8(10)	$\langle 3,5\rangle^+$									22(10)	38.4	0.001				90Ve04
9580.5(10)	3^-				0.072	1				20000(2000)	333	0.060				90Ve04
9585.1(10)	1^+									3800(400)	640	0.006				90Ve04
9593.9(10)																
9598.5(10)																
9611.9(10)																
9659(6)	$\langle 1$–$7\rangle^+$															
9720.5(10)	$\langle 5,7\rangle^-$				0.017	3				30(10)	6.24	0.005				90Ve04
9722.8(10)	3^-				0.027	1				24000(2000)	418	0.057				90Ve04
9756(2)	5^+									3(2)	55.2	<0.001				90Ve04

(continued) **$^{31}_{15}$P**

E^*	$2J^\pi$	$2T$	S'^+_p	C^2S	C^2S	ℓ_p	C^2S	C^2S'	C^2S'	Γ_p	γ^2_p	C^2S	ℓ_p	σ (p,α)	S_N	Ref.
[keV]			eval	(τ,d)	(τ,d)		(d,n)	(d,n)	(τ,d)	[eV]	[keV]	(p,p)		μb	*rel.*	
9760(2)	5^+									20(7)	55.4	<0.001				90Ve04
9765(2)	3^-,$\langle 1^- \rangle$									300(70)	446	0.001				90Ve04
9765(2)	3^+,$\langle 5^+ \rangle$									200(50)	55.6	0.004				90Ve04
9787(2)	3^-				0.067	1				50000(5000)	460	0.109				90Ve04
9814(2)	$\langle 5,7 \rangle^-$									12(5)	7.80	0.002				90Ve04
9816(2)	3^-									150(20)	482	<0.001				90Ve04
9819(2)	3^-				0.028	1				4500(450)	483	0.009				90Ve04
9840(2)	7^-,$\langle 5^- \rangle$				0.007	3				66(15)	8.26	0.008				90Ve04
9843(2)	3^+									50(10)	65.2	0.001				90Ve04
9852(2)	7															
9865(2)	7															
9867(2)	3^-									350(35)	518	0.001				90Ve04
9907(2)	9															
9908(2)	3^-									35000(35)	547	0.001				90Ve04
9925(2)	3															
9928(2)	5^+									170(20)	88.8	0.002				90Ve04
9941(2)																
9946(2)	5^-,$\langle 7^- \rangle$				0.014	3				125(15)	7.44	0.017				90Ve04
9963(2)	1^+															
9976(2)																
9988(2)																
9999(2)	1^+															
10017(2)																
10019(2)	$5^{\langle - \rangle}$															
10046(2)	5^-															
10075(2)																
10089(2)	3^+,$\langle 5^+ \rangle$															
10092(2)	1^+															
10093(2)	3^-															
10098(2)	3^-															
10116(2)	1^-															
10144(2)																
10153(2)	1^+															
10192(2)	3															
10207(2)																
10210(2)																

(continued) **$^{31}_{15}$P**

E^*	$2J^\pi$	S'^{+}_p	C^2S	C^2S	ℓ_p	C^2S	C^2S'	C^2S'	Γ_p	S^-_p	C^2S	ℓ_p	σ (p,α)	S_N	Ref.
[keV]		eval	(τ,d)	(τ,d)		(d,n)	(d,n)	(τ,d)	[eV]	eval	(d,τ)		μb	*rel.*	
10225(2)	7	77En02	84Mc12	90Ve04		70Lu07	76Uz01		90Ve04	77En02	74Ma34		77Pe03	77Pe03	Ref.

Additional data on this isotope can be found in [77Pe03, 70Wo01, 70Mo01].
Abundance: 100 %.
Values S'^{+}_p and S^-_p are from evaluation [77En02]; three sets of values C^2S from proton transfer (τ,d) reaction are from [94Ve02], [84Mc12] and [90Ve04] (including ℓ_p); similar values C^2S from the (d,n) reaction are taken from [90Ve04]; corresponding values $(2J+1)C^2S=C^2S'$ from two original works [76Uz01, 70Lu07] on the (d,n) and (τ,d) reactions are given in the next columns.
Parameters Γ_p, γ^2_p and C^2S from proton scattering [76Ou01] were given in [90Ve04] where a comparison of the spectroscopic information in ^{31}Si and ^{31}P with shell-model calculations was performed.
Values C^2S from proton pickup (d,τ) reaction [74Ma34] can be compared with the evaluated S^-_p from [77En02].

Energy levels and branching ratios [90En08, 98En04]. Part 2 **$^{31}_{15}$P**

E^*	$2J^\pi$	$T_{1/2}$ or	Ref.	Branching ratios in percentage							
			E^*_f:	0	1266	2234	3134	3295	3415	3506	4190
[keV]		Γ_{cm}	$2J^\pi_f$:	1^+	3^+	5^+	1^+	5^+	7^+	3^+	5^+
0	1^+	Stable	94Ve02								
1266.2(1)	3^+	520(25) fs	94Ve02	100							
2233.7(2)	5^+	250(9) fs	94Ve02	100	<0.1						
3134.1(3)	1^+	6.7(5) fs	77En02	97.3(3)	2.7(3)	<2					
3295.0(2)	5^+	80(14) fs	77En02	1.1(2)	78(1)	21(1)					
3414.6(3)	7^+	220(30) fs		<0.8	97.3(6)	2.7(6)					
3505.8(5)	3^+	8.4(14) fs	77En02	59(2)	41(2)	<5.0					
4190.3(4)	5^+	5(2) fs	77En02	<1.4	76(2)	24(2)		<0.5			
4260.7(7)	3^+	10(3) fs	77En02	74(2)	26(2)		<1.0	<0.4			
4430.9(3)	7^-	420(7) fs	77En02	1.0(2)	1.9(5)	53(3)	<0.10	40(2)	4.1(8)		
4593.6(8)	3^+	17(7) fs	90Ve04	24(2)	57(2)	19(2)		<2.0	<0.5		
4633.8(5)	7^+	75(10) fs		<4	3.0(7)	26.3(1)	<2.0	34(2)	36(1)		
4783.1(5)	5^+	8(3) fs	90Ve04	43(2)	5(2)	19(2)	<1.0	33(2)	<2.0		
5014.9(10)	3	40(10) fs		72(4)	23(4)			2.0(10)	<0.5	3.0(10)	
5015.2(8)	1	<7 fs		39(3)	59(3)	<1.0	2.0(5)	<3	<2.0		
5115.4(6)	5^+	10(3) fs	90Ve04	<5	50(3)	25(2)	<4	11(2)	14(2)		
5256.1(14)	1^+	1.3(2) fs	90Ve04	100					<3		
5343.1(5)	9^+	42(11) fs		<3.9	<2.0	13(3)		5.0(20)	82(3)		
5529.3(8)	7^+,$\langle 5^+\rangle$	<7 fs		<5.0		30(5)		35(5)	35(5)		
5559.2(11)	3^+	4.7(11) fs	90Ve04	88.0(20)	<10.0	12.0(20)					
5672.3(9)	5	28(7) fs		2.0(11)	76(5)	12(5)	<1.0	<1.0	10(3)		
5773.1(8)	$\langle 5,7^+\rangle$	22(9) fs		<5.0	20(4)	17(4)			37(5)		12(4)
5892.3(6)	9^+	23(6) fs		<5.0	<5.0	91.0(20)	<10	<3.0	9.0(20)		

(continued) **$^{31}_{15}$P**

E^*	$2J^\pi$	$T_{1/2}$ or	Ref.	Branching ratios in percentage								
				E_f^*:	0	1266	2234	3134	3295	3415	3506	4190
[keV]		Γ_{cm}		$2J_f^\pi$:	1^+	3^+	5^+	1^+	5^+	7^+	3^+	5^+
5987.9(12)	$\langle 3,5\rangle^+$		90Ve04				93.0(20)	<3.0	7.0(20)			
6047.8(10)	7^+	22(11) fs					22(5)		22(6)	40(6)		
6080.1(14)	9^+	22(11) fs			<10.0	<8	88.0(20)					
6233.1(13)	$\langle 3^+–9^+\rangle$				7(4)		40(13)			53(7)		
6336.6(15)	1^+		90Ve04		100							
6380.8(17)	3^+	<7 fs			12(2)	12(5)	62(6)		14(2)	<2.3		
6398.6(7)	$\langle 5^-,7\rangle$	30(10) fs			<2.0		2.5(7)	<2.0	6.3(14)	2.0(6)		
6453.7(11)	11^+	23(9) fs			<1.0	<2.0	<1.0	<2.0		89(4)		
6460.8(16)	5^+		90Ve04		22(12)			78(6)				
6495.8(12)	3^-		90Ve04		76(5)	24(5)		<5.0	<5.0			
6500.6(9)	9^-	38(12) fs								25(5)		
6594.2(14)	5^-		90Ve04		<7	71(7)						
6610.3(10)	3^-		90Ve04		17(4)	31(5)						7(3)
6792.9(9)	9^-	140(30) fs								25(8)		
6825.1(9)	11^-	85(35) fs								<8.0		
6842.3(12)	$\langle 5,7\rangle^-$		90Ve04				60(10)		40(10)			
6909.2(14)	3^-	2.7(6) fs	90Ve04		80(6)	<10.0	20(6)					
6931.7(14)	5^+	<30 fs	90Ve04		<10.0		86(4)					
7068(4)	$\langle 5,7\rangle^-$		90Ve04									
7079.9(14)	$\langle 3^-,5^+\rangle$				50(15)							
7084.0(17)	$\langle 3^+–7^+\rangle$				<2.9	11(3)	21(5)	<4.0	20(5)	43(5)	5(2)	
7117.9(7)	$9^{\langle+\rangle}$	<15 fs								100		
7140.6(15)	1^+	0.23(2) fs	90Ve04		84(4)	16(4)						
7214(2)	$\langle 1,3\rangle^-$		90Ve04		100	<7.1						
7313.7(16)	$\langle 1,3\rangle^+$		90Ve04		100							
7314.4(4)	$\langle 5,7\rangle^-$											
7349(5)	$\langle 3,5\rangle^-$											
7441.2(7)	11^+	<10 fs								91.0(20)		
7466(2)	$\langle 7,9\rangle^-$	<20 fs								45(10)		
7687(2)							100					
7715(5)												
7736(4)	$\langle 5,7\rangle^-$		90Ve04									
7779.3(10)	3^-		90Ve04									
7825(12)												
7852(3)	$\langle 1–5^+\rangle$	0.44(7) fs			100							
7896.8(12)	1^-	68(9) eV	90Ve04									
7913(4)	$\langle 5,7\rangle^-$		90Ve04									
7945.5(10)	3^+		90Ve04									
7994(6)	$\langle 1–5\rangle^-$		90Ve04									
8032.2(9)	5											
8048.7(10)	3^-		90Ve04									
8085(11)												
8104.7(13)	5^+		90Ve04									
8208.0(6)	3^+	2.6(2) eV										
8224.7(6)	7											

(continued) **$^{31}_{15}$P**

E^* [keV]	$2J^\pi$	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage								
				E_f^*:	0	1266	2234	3134	3295	3415	3506	4190
				$2J_f^\pi$:	1^+	3^+	5^+	1^+	5^+	7^+	3^+	5^+
8243.0(6)	5^-		90Ve04									
8247.1(6)	3^-		90Ve04									
8345.5(15)	$\langle 7^-,9^+\rangle$											
8355.6(6)	5^-		90Ve04				20(10)			60(20)		20(15)
8433.8(7)	7^-											
8460.9(7)	5^+	2(1) eV	90Ve04									
8470.2(7)	5											
8543.5(8)	1^-	54(10) eV	90Ve04									
8552.1(8)	1^+	320(40) eV	90Ve04									
8555.3(8)	3^-	210(30) eV	90Ve04									
8575.5(8)	5^+	7(5) eV	90Ve04									
8584.0(8)	1^-	50(10) eV	90Ve04									
8600.8(8)	5^+											
8641.1(8)	5^+	5(3) eV	90Ve04									
8649.3(8)	3^+											
8728.9(8)	$3^{\langle+\rangle}$											
8730.4(8)	3											
8737.8(8)	3^+	20(5) eV	90Ve04									
8754.1(8)												
8757.2(8)	5^+	3(2) eV	90Ve04									
8763.2(9)	1^+	1.45(15) keV	90Ve04									
8839.8(9)	5^+	1(1) eV	90Ve04									
8902.8(10)	1^+	90(15) eV	90Ve04									
8909.6(10)	5^+	1(1) eV	90Ve04									
8935.7(10)	3^+	3(2) eV	90Ve04									
8985.7(10)	3											
9008.9(11)	5^+	65(20) eV	90Ve04									
9046.0(11)	3^-	9.4(9) keV	90Ve04									
9052.6(11)	$\langle 3,5\rangle^+$											
9067.0(11)	5^+	16(5) eV	90Ve04									
9113.4(6)	7^-	1(1) eV	90Ve04									
9115.5(6)	5^+	22(7) eV	90Ve04									
9128.5(6)	5^+	3(2) eV	90Ve04									
9130.9(6)	5^+	4(2) eV	90Ve04									
9154.2(6)	7^-											
9156.3(6)	3^+											
9176.0(6)	3^-	80(15) eV	90Ve04									
9206.1(6)	7^+											
9226.3(6)	1^-	4.0(4) keV	90Ve04									
9240.7(7)	3^+	150(15) eV	90Ve04									
9252.9(7)	7^-	3(1) eV	90Ve04									
9255.9(7)	7											
9290.8(7)	3^-	9.8(10) keV	90Ve04									
9319.6(8)	1											
9358.2(8)	$\langle 7\rangle$											

(continued) **$^{31}_{15}$P**

E^* [keV]	$2J^\pi$	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage							
			E_f^*:	0	1266	2234	3134	3295	3415	3506	4190
			$2J_f^\pi$:	1^+	3^+	5^+	1^+	5^+	7^+	3^+	5^+
9360.9(8)	⟨7⟩										
9362.4(8)	3^-	10(1) keV	90Ve04								
9399.8(8)	1^+	500(80) eV	90Ve04								
9412.5(8)	7^-	500(80) eV	90Ve04								
9440.8(9)	3^+	180(20) eV	90Ve04								
9448.9(9)	5^+	450(30) eV	90Ve04								
9477.0(9)	7^-										
9524(3)	3^-	22(2) keV	90Ve04								
9524.7(9)	⟨5,7^+⟩										
9534(3)	⟨3,5⟩$^+$	15(10) eV	90Ve04								
9536.5(10)	9^+										
9570.5(10)	3										
9577.8(10)	⟨3,5⟩$^+$	22(10) eV	90Ve04								
9580.5(10)	3^-	20(2) keV	90Ve04								
9585.1(10)	1^+	3.8(4) keV	90Ve04								
9593.9(10)											
9598.5(10)											
9611.9(10)											
9659(6)	⟨1–7⟩$^+$										
9720.5(10)	⟨5,7⟩$^-$	30(10) eV	90Ve04								
9722.8(10)	3^-	24(2) keV	90Ve04								
9756(2)	5^+	3(2) eV	90Ve04								
9760(2)	5^+	20(7) eV	90Ve04								
9765(2)	3^-,⟨1^-⟩	300(70) eV	90Ve04								
9765(2)	3^+,⟨5^+⟩	200(50) eV	90Ve04								
9787(2)	3^-	50(5) keV	90Ve04								
9814(2)	⟨5,7⟩$^-$	12(5) eV	90Ve04								
9816(2)	3^-	150(20) eV	90Ve04								
9819(2)	3^-	4.5(5) keV	90Ve04								
9840(2)	7^-,⟨5^-⟩	66(15) eV	90Ve04								
9843(2)	3^+	50(10) eV	90Ve04								
9852(2)	7										
9865(2)	7										
9867(2)	3^-	350(40) eV	90Ve04								
9907(2)	9										
9908(2)	3^-	350(40) eV	90Ve04								
9925(2)	3										
9928(2)	5^+	170(20) eV	90Ve04								
9941(2)											
9946(2)	5^-,⟨7^-⟩	125(15) eV	90Ve04								
9963(2)	1^+	5.0(5) keV									
9976(2)											
9988(2)											
9999(2)	1^+	8.0(8) keV									
10017(2)											

(continued) **$^{31}_{15}$P**

E^*	$2J^\pi$	$T_{1/2}$ or	Ref.	Branching ratios in percentage								
				E_f^*:	0	1266	2234	3134	3295	3415	3506	4190
[keV]		Γ_{cm}		$2J_f^\pi$:	1^+	3^+	5^+	1^+	5^+	7^+	3^+	5^+
10019(2)	$5^{\langle-\rangle}$	1(1) eV										
10046(2)	5^-	220(30) eV										
10075(2)												
10089(2)	3^+,$\langle5^+\rangle$	90(15) eV										
10092(2)	1^+	180(20) eV										
10093(2)	3^-	270(30) eV										
10098(2)	3^-	1.0(1) keV										
10116(2)	1^-	3.4(3) keV										
10144(2)												
10153(2)	1^+	4.0(4) keV										
10192(2)	3											
10207(2)												
10210(2)												
10225(2)	7											
			Ref.									

Energy levels and branching ratios [90En08, 98En04]. Part 3 **$^{31}_{15}$P**

E^*	$2J^\pi$				Branching ratios in percentage						
		E_f^*:	4261	4431	4634	5015	5115	5343	5672	6454	6501
[keV]		$2J_f^\pi$:	3^+	7^-	7^+	3	5^+	9^+	5	11^+	9^-
5256.1(14)	1^+			<3							
5529.3(8)	7^+,$\langle5^+\rangle$			<3.0							
5672.3(9)	5			<0.5							
5773.1(8)	$\langle5,7^+\rangle$				14(4)						
6047.8(10)	7^+				15(6)						
6080.1(14)	9^+				12.0(20)						
6398.6(7)	$\langle5^-,7\rangle$			79.6(20)			5.4(12)		4.2(8)		
6453.7(11)	11^+							11(4)			
6500.6(9)	9^-			75(5)							
6594.2(14)	5^-		6(3)	23(7)							
6610.3(10)	3^-				<3.5	45(4)					
6792.9(9)	9^-			75(8)							
6825.1(9)	11^-			60(10)				40(10)			
6931.7(14)	5^+			14(4)	<5.0						
7079.9(14)	$\langle3^-,5^+\rangle$			50(15)							
7441.2(7)	11^+									9.0(20)	
7466(2)	$\langle7,9\rangle^-$			45(10)							10(5)

Energy levels and branching ratios [89Ec03, 90En08, 98En04]. **$^{32}_{15}$P**

E^* [keV]	J^π	T	$S_{dp}(20°)$ μb/sr	$S_{dp}(30°)$ μb/sr	Br %	ℓ_n	S'^+_n	S^+_n eval	σ (α,d) μb/sr	S' (d,p)	$T_{1/2}$ or Γ_{cm}	Ref.
0	1^+		1304	474	0.38	0	0.02	<0.02		<0.07	14.26(1) d	90En08
						2	1.4	0.80(21)		3.0		77En02
78.06(2)	2^+		2094	664	0.89	2	2.3	0.82(15)		4.7	278(9) ps	77En02
512.70(3)	0^+		239	360	5.0	0	0.32	0.44(12)		0.32	1.83(8) ps	77En02
1149.39(3)	1^+		491	659	15.0	0	0.26	0.18(5)		0.53	183(12) fs	77En02
							0.16					90En08
1322.84(2)	2^+		7	8	0.082	2		small			337(17) fs	
1755.0(1)	3^+		52	22	0.056	2	0.04	0.01	54	0.07	430(28) fs	77En02
2177.2(2)	3^+		24	12	0.087	2	0.02	small	25		53(10) fs	
2217.8(1)	2^+		221	46	0.40	2	0.15	0.07(2)		0.33	166(17) fs	77En02
2229.70(6)	1^+		349	241	0.10	0	0.10	0.04(2)		0.33	<35 fs	77En02
						2	0.22	0.13(4)		0.40		77En02
2313.5(2)												89Mi16
2579.1(2)					0.068							89Mi16
2657.53(9)	2^+		130	49	1.14	2	0.08			0.20	8(3) fs	
2740.36(6)	1^+		13		1.31	2	0.02			0.04	14(5) fs	
3004.6(8)	3^+		121	52		2	0.06	0.01		0.22	70(11) fs	77En02
3073.9(4)					0.077							89Mi16
3149.0(13)	4^+		2								410(80) fs	
3263.99(5)	2^-			647	12.0	1	0.86	0.22(6)	70	1.1	114(15) fs	77En02
3319.9(14)	3^-			1807		3	3.1	0.44(11)		3.1	190(35) fs	77En02
3443.0(6)	4^-		4004		2.0	3	7.0	0.78(20)	70	7.0	270(30) fs	77En02
3444.35(4)	$\langle 1,2^+ \rangle$					3	incl				26(10) fs	
3791.9(5)					0.21	0	0.01					89Mi16
						2	0.01					90En08
3796.1(6)	1^+			7				0.02(1)		0.13	4.0(14) fs	77En02
3880.3(6)	2^+		253	86		2	0.14			0.28	<14 fs	
3989.8(6)	3^+					2	$\langle 0.02 \rangle$				<10 fs	
4008.93(6)	2^-			1488	2.3	1	0.33	0.07(2)	30	0.33		77En02
						3	0.62	0.12(3)		0.62		
4034.6(4)	4^+					1					31(21) fs	
4035.58(4)	1^-			6060	18.1	1	0.70	0.4(1)		1.3		77En02
4149.3(8)	3^-		121			3	0.18			0.19	21(7) fs	73Va13
4204.6(5)	1^+		73	113		0	0.04					
						2	0.03					
4275.2(4)	5^-		17	22					90		600(110) fs	76De24
4313.3(17)	3^+		31	13		2	0.01				60(35) fs	
4409.3(6)	0^-		80	36		1	0.04				13(2) fs	
4548.2(6)	1^+				0.123							
4554.6(5)	2^+		97	29		2	0.07					
4611(2)	3^+		42	20		2	0.02					
4661.45(4)	2^-			2533	5.2	1	0.30				2.8(5) fs	
4697.0(7)	$\langle 3,5 \rangle^+$		15	14		4	0.002		80			76De24
4710.55(11)	1^+			40	0.35	0	0.02					
						2	0.01					

(continued) **$^{32}_{15}$P**

E^* [keV]	J^π	T	$S_{dp}(20°)$ μb/sr	$S_{dp}(30°)$ μb/sr	Br %	ℓ_n	S'^+_n	S^+_n eval	σ (α,d) μb/sr	S' (d,p)	$T_{1/2}$ or Γ_{cm}	Ref.
4743.3(4)	5^+			5		4	0.002				110(50) fs	
4849.3(6)	⟨3–5⟩			5								
4877.37(5)	1^-			267	7.1	1	0.36				4.0(8) fs	
4942.5(9)				3								
5006.2(10)			23									
5011.8(30)												89Mi16
5072.44(6)	0^+	2			2.1				55			76De24
5080.9(10)	⟨2,4⟩$^-$		715			3					120(50) fs	
5129.4(15)			10									
5234.0(9)	⟨0–2⟩$^-$		37	16		1	0.01					
5252.9(12)	⟨3–5⟩										<60 fs	
5326.0(4)					0.15							89Mi16
5349.62(6)	2^-		1422	558	6.4	1	0.58				5.3(6) fs	
5396.1(9)				2								
5493.2(7)			219			>2						
5509.32(5)	1^-		448		1.9	1	0.20		17		7.1(10) fs	76De24
5554.3(10)			10									
5588(2)												
5662.2(9)			30									
5673.6(8)	⟨1,2⟩$^+$			8		2	0.04					
5701.47(8)	⟨1,2⟩$^-$			13	0.9	1	0.06					
5725.3(6)	⟨2–4⟩$^-$			12		3						
5778.77(5)	1^-			65	9.0	1	0.62				1.0(5) fs	
5815.2(16)	⟨3,4⟩$^-$			170		3			50			76De24
5830.1(9)									incl			
5860.2(11)	⟨0–2⟩$^-$			252		1	0.03		incl			
5968.7(22)			28	25								
5971.8(21)			43	68								
5989(8)												
6026.2(10)	⟨2–4⟩$^-$		62	43		3						
6062.22(5)	1^-		531	244	2.2	1	0.26				1.0(4) fs	
6104.5(6)	3^+		49	22		2+4						
6131(8)									25			76De24
6147.2(22)	⟨1–3⟩$^+$		19			2			incl			
6160(8)												
6196.32(6)	1^-		313	168	1.5	1	0.14				<5 fs	
6276.0(12)				9								
6298.1(14)												
6310.8(11)				22								
6332.6(3)	⟨0,1⟩$^+$					0					<5 fs	
6378.0(15)												
6394.0(15)				8								
6413.0(6)				4								
6434.1(32)				15								
6477.0(27)	⟨2–4⟩$^-$			24		3						

(continued) **$^{32}_{15}$P**

E^* [keV]	J^π	T	$S_{dp}(20°)$ μb/sr	$S_{dp}(30°)$ μb/sr	Br %	ℓ_n	S'^+_n	S^+_n eval	σ (α,d) μb/sr	S' (d,p)	$T_{1/2}$ or Γ_{cm}	Ref.
6510.6(4)					0.17							89Mi16
6531.4(12)				357					30			76De24
6553.0(3)	$\langle 0^+–3^+\rangle$		255			3						89Mi16
6557.97(19)					0.37							
6581.93(6)	$\langle 0^+–3^+\rangle$			984	0.9							
6682.3(33)			85									
6685.0(20)			40									
6705.3(12)			153			3						
6707.8(15)			138									
6733.8(10)			18									
6738.1(11)			9									
6783.7(2)	$\langle 0^+–3^+\rangle$				0.24							
6857.7(11)			399						180			76De24
6996.9(33)				37								
7066.7(28)				52								
7339.8(20)			70									
7343.1(18)			122									
7392.7(23)			247						380			76De24
7655.4(34)				11								
7679.0(14)			65	23								
7767.2(25)				75								
7806.6(26)	$\langle 2–4\rangle^-$		111	63		3						
7810.2(34)	$\langle 2–4\rangle^-$		155	77		3						
7851.7(20)	$\langle 2–4\rangle^-$			36		3						
7875.3(36)	$\langle 3–5\rangle^+$			131		4						
7925.5(20)			8	17								
7939.6(20)			9	17								
7957.9(28)			58	65								
7962.4(5)			45	44							<3 eV	
7990.5(28)				35								
8017.9(5)	$\langle 2–4\rangle^-$		249	109		3					<30 eV	
8026.3(5)											<30 eV	
8038.3(5)	$\langle 1,2\rangle^+$		83	29		2					<40 eV	
8040.6(5)			91	32							<40 eV	
8046.3(5)											<40 eV	
8079.4(5)				22							<60 eV	
8082.6(18)				21								
8087.7(5)											<60 eV	
8088.5(5)	1^+										2.03(14) keV	
8092.9(5)											1.7(6) keV	
8098.7(21)			133	95								
8114.2(5)											1.3(2) keV	
8149.4(5)											0.91(7) keV	
8154.2(5)											<100 eV	
8157.5(5)	$\langle 2–4\rangle^-$		199	74		3					0.65(7) keV	

(continued) **$^{32}_{15}$P**

E^* [keV]	J^π	T	$S_{dp}(20°)$ μb/sr	$S_{dp}(30°)$ μb/sr	Br %	ℓ_n	S'^+_n	S^+_n eval	σ (α,d) μb/sr	S' (d,p)	$T_{1/2}$ or Γ_{cm}	Ref.
8167.2(5)				33							0.41(3) keV	
8183.3(5)											0.21(2) keV	
8197.3(5)											0.31(3) keV	
8202.4(5)	$\langle 2–4\rangle^-$		208	68		3					<130 eV	
8242.1(6)											<150 eV	
8247.4(28)			307	15								
8279.9(6)											<180 eV	
8285.6(6)											1.2(3) keV	
8292											25 keV	
8292.9(6)											0.46(8) keV	
8300.8(6)											0.64(10) keV	
8330.7(6)											<200 eV	
8337.6(6)	$\langle 1,2\rangle^+$		87	37		2					1.2(2) keV	
8354.7(6)											0.58(7) keV	
8357.7(6)											<200 eV	
8359											20 keV	
8363.1(26)			30									
8383.9(6)											1.3(3) keV	
8406.9(6)												
8415.0(6)												
			89Ec03				90En08		76De24			Ref.
					89Ec03			77En02		73Va13		Ref.

Additional data on this isotope can be found in [97Ka15, 89Mi16, 89Ec03, 73Va14, 73Va13].

Comments on carbon or silicon contamination, poor resolution or poor statistics in the measurments at angles 50° or 10° can be found in [89Ec03]

Levels at E^*=2313, 2579, 3074, 3792, 5012, 5326, 6511, 6553 keV are from [89Mi16].

Values $(2J+1)S^+_n$ are from [90En08] where a comparison of data [73Va13, 89Ec03] measured with good energy resolution of 5–8 keV was performed.

Energy levels and branching ratios [89Ec03, 90En08, 98En04]. Part 2 **$^{32}_{15}$P**

E^* [keV]	J^π	E^*_f: J^π_f:	Branching ratios in percentage 0 1^+	78.06 2^+	512.7 0^+	1149 1^+	1323 2^+	1755 3^+	2177 3^+	2217.8 2^+	2229.7 1^+
78.06(2)	2^+		100								
512.70(3)	0^+		100	<2							
1149.39(3)	1^+		7.5(7)	43(1)	50(2)						
1322.84(2)	2^+		59(1)	41(1)		<1.0					
1755.0(1)	3^+		2.1(6)	95.9(6)		<1	2.0(1)				
2177.2(2)	3^+		9.0(9)	91.0(9)		<3.0	<3.0	<1			
2217.8(1)	2^+		47(2)	12(2)		9(2)	32(1)	<1.0			
2229.70(6)	1^+		6(1)	92(4)		<5.0	1.9(6)	<4.0			

(continued) **$^{32}_{15}$P**

E^*	J^π		Branching ratios in percentage								
		E_f^*:	0	78.06	512.7	1149	1323	1755	2177	2217.8	2229.7
[keV]		J_f^π:	1^+	2^+	0^+	1^+	2^+	3^+	3^+	2^+	1^+
2657.53(9)	2^+		69(4)	24(4)		<1.0	<2.0	7(2)	<2.0		
2740.36(6)	1^+		25(3)		75(3)		<9	<7.0	<7.0		
3004.6(8)	3^+		6.7(6)	84.9(8)		<2.0	4.4(5)		4.0(3)		<0.9
3149.0(13)	4^+			7.1(3)		<0.5	59(1)	13.4(7)	20.2(3)		
3263.99(5)	2^-		2.4(2)	12(1)		46(2)	18(2)	11.6(8)	<3.0		10.3(9)
3319.9(14)	3^-			75(2)			25(2)	<4.0			
3443.0(6)	4^-							94(1)	6(1)		
3444.35(4)	$\langle 1,2^+\rangle$		38(3)	39(3)	7(1)	<8	<7	<5.0			16(3)
3796.1(6)	1^+			22(1)			78(1)				
3880.3(6)	2^+		68(5)	32(5)							
3989.8(6)	3^+			100							
4008.93(6)	2^-		33(3)	28(3)			4.4(8)				
4034.6(4)	4^+			35(2)				65(2)			
4035.58(4)	1^-		0.23	3.2(2)	67(3)	21(3)	1.5(2)				3.7(9)
4149.3(8)	3^-			76(1)					<4.0	10.8(12)	
4204.6(5)	1^+			100							
4313.3(17)	3^+			100							
4548.2(6)	1^+				100						
4554.6(5)	2^+								34(2)	12(2)	
4661.45(4)	2^-		77(2)			5.5(4)	5.1(4)				7.2(11)
4710.55(11)	1^+			56(4)		44(4)					
4743.3(4)	5^+							<4.0	29(1)		
4849.3(6)	$\langle 3–5\rangle$							33(1)	23(1)		
4877.37(5)	1^-		9.7(6)	2.8(2)	68.2(10)		8.1(5)				
5072.44(6)	0^+		4.7(6)			85.8(9)					9.4(5)
5080.9(10)	$\langle 2,4\rangle^-$							39(3)			
5349.62(6)	2^-		5.3(3)			69(2)	1.1(1)				8.6(6)
5509.32(5)	1^-		3.1(3)	8.7(8)		64(5)					
5701.47(8)	$\langle 1,2\rangle^-$			36(3)		14(3)				50(4)	
5778.77(5)	1^-		13(1)	8.0(4)	40(2)	5.8(3)	2.60(10)			1.90(10)	11.2(6)
6062.22(5)	1^-		27(1)	4.2(3)	9.4(7)	45(3)	14.0(10)				
6196.32(6)	1^-		41(3)	15(1)	44(3)						
6332.6(3)	$\langle 0,1\rangle^+$		74(1)	12(1)		13.9(8)					
6557.97(19)			20(4)	8(1)							
6581.93(6)	$\langle 0^+–3^+\rangle$		36(2)	47(2)		17(2)					
6783.7(2)	$\langle 0^+–3^+\rangle$					13.6(8)					

Energy levels and branching ratios [89Ec03, 90En08, 98En04]. Part 3 **$^{32}_{15}$P**

E^*	J^π					Branching ratios in percentage				
		E_f^*:	2657.5	2740.4	3004.6	3149.0	3264.0	3319.9	3443.0	3444.4	4008.9
[keV]		J_f^π:	2^+	1^+	3^+	4^+	2^-	3^-	4^-	$\langle 1,2^+\rangle$	2^-
4008.93(6)	2^-						35(5)				
4035.58(4)	1^-		1.8(5)				1.5(4)				
4149.3(8)	3^-		13.3(11)			<9.0					
4275.2(4)	5^-					23.0(12)			77.0(12)		
4554.6(5)	2^+		16(2)		38(2)						
4661.45(4)	2^-			3.2(8)						2.2(6)	
4697.0(7)	$\langle 3,5\rangle^+$					9.7(9)			82.4(11)		
4743.3(4)	5^+				12.2(11)	47(1)					
4849.3(6)	$\langle 3–5\rangle$					44(1)					
4877.37(5)	1^-			4.0(6)			5.0(10)			2.1(5)	
5080.9(10)	$\langle 2,4\rangle^-$							61(3)			
5252.9(12)	$\langle 3–5\rangle$								100		
5349.62(6)	2^-			3.1(6)							8(2)
5778.77(5)	1^-						15(2)				
6783.7(2)	$\langle 0^+–3^+\rangle$		68.3(10)	18.1(10)							

Energy levels and branching ratios [89Ec03, 90En08, 98En04]. Part 4 **$^{32}_{15}$P**

E^*	J^π			Branching ratios in percentage		
		E_f^*:	4034.6	4035.6	4548.2	5349.6
[keV]		J_f^π:	4^+	1^-	1^+	2^-
4697.0(7)	$\langle 3,5\rangle^+$		7.8(7)			
4743.3(4)	5^+		12.3(7)			
5349.62(6)	2^-			4.2(11)		
5509.32(5)	1^-			24(5)		
5778.77(5)	1^-				2.6(6)	
6553.0(3)	$\langle 0^+–3^+\rangle$					72(5)
6557.97(19)						72(5)

Energy levels and branching ratios [88Kh04, 90En08, 98En04]. **$^{33}_{15}$P**

E^*	$2J^\pi$	S_p^-	$n\ell j$	$C^2S_p^+$	σ (d,τ)	L	C^2S	Ref.
[keV]		eval			μb/sr	(d,τ)	(d,τ)	
0.0	1^+	2.1(4)	$2s_{1/2}$	1.36	5.7	$\langle 0\rangle$	2.2	77En02
1431.6(2)	3^+		$1d_{3/2}$	0.73	0.26	$\langle 2\rangle$	0.37	84Th08
1847.6(1)	5^+	7(2)	$1d_{3/2}$	1.26	1.20	$\langle 2\rangle$	1.27	77En02
2538.6(7)	3^+		$1d_{3/2}$	<0.01	<0.01	$\langle 2\rangle$	<0.1	88Kh04
3275.4(9)	3^+		$1d_{3/2}$	0.15	0.19	$\langle 2\rangle$	0.06	88Kh04

(continued) **$^{33}_{15}$P**

E^* [keV]	$2J^\pi$	S_p^- eval	$n\ell j$	$C^2S_p^+$	σ (d,τ) μb/sr	L (d,τ)	C^2S (d,τ)	Ref.
3489.8(6)	5^+		$1d_{5/2}$	0.36	0.43	2	0.19	88Kh04
3627.6(6)	7^+				<0.06	⟨4⟩		84Th08
4047.8(8)	5^+		$1d_{5/2}$	1.48	1.14	2	0.46	88Kh04
4194(2)	5^+							
4226.0(3)	7^-							
4856(1)	$3,5^+$							
5050(2)	5^+		$1d_{5/2}$	1.91	1.17	2	0.34	88Kh04
5191(3)								
5406(3)								
5452.6(4)	9^-							
5498(3)								
5549(3)								
5558(3)	3							
5638.0(4)	11^-							
5674(3)	1^+		$1d_{5/2}$+	0.12+				88Kh04
			$2s_{1/2}$	0.06				88Kh04
5731(5)								
5785(3)								
5816(2)								
5931(4)								
5970(4)			$1d_{5/2}$+	0.28+				88Kh04
			$2s_{1/2}$	0.16				88Kh04
6115(3)								
6124(5)								
6182(4)								
6327(5)								
6432(4)	5^+		$1d_{5/2}$	0.42				88Kh04
6509(4)								
6559(4)								
6820(60)	5^+		$1d_{5/2}$	0.42				88Kh04
7146(12)	5^+		$1d_{5/2}$	0.60				88Kh04
7565(34)			$1p_{1/2}$	<0.40				88Kh04
8510(24)			$1p_{1/2}$	<0.50				88Kh04
				88Kh04	84Th08		84Th08	Ref.

Energy levels and branching ratios [88Kh04, 90En08, 98En04]. Part 2 **$^{33}_{15}$P**

E^* [keV]	$2J^\pi$	C^2S (d,τ)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage					
					E_f^*:	0.0	1432	1848	2539	3275
					$2J_f^\pi$:	1^+	3^+	5^+	3^+	3^+
0.0	1^+	1.28	25.3(1) d	77En02						
1431.6(2)	3^+	0.68	450(55) fs	84Th08		100				

(continued) **$^{33}_{15}$P**

E^*	$2J^\pi$	C^2S	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
				E_f^*:	0.0	1432	1848	2539	3275
[keV]		(d,τ)	Γ_{cm}	$2J_f^\pi$:	1^+	3^+	5^+	3^+	3^+
1847.6(1)	5^+	1.35	0.8(1) ps	77En02	93(2)	7(2)			
2538.6(7)	3^+		<50 fs	88Kh04	85(2)	8(1)	7(1)		
3275.4(9)	3^+		140(20) fs	88Kh04	48(2)	<3	52(2)	<3	
3489.8(6)	5^+		62(14) fs	88Kh04	7(2)	40(4)	53(4)	<3	<3
3627.6(6)	7^+		140(25) fs	84Th08	<1	70(2)	30(2)	<5	<6
4047.8(8)	5^+		59(17) fs	88Kh04	5(3)	78(4)	<4	11(4)	7(3)
4194(2)	5^+		<100 fs		100	<4	<5		
4226.0(3)	7^-		310(50) fs		<4	<4	89(2)		
4856(1)	$3,5^+$		<75 fs		20(4)	<2	80(4)	<2	<3
5050(2)	5^+		<60 fs	88Kh04	48(4)	12(4)	35(4)	5(2)	<7
5191(3)			<125 fs		<5	63(4)	37(4)	<7	<7
5406(3)			<75 fs				70(10)	30	
5452.6(4)	9^-		24(5) ps						
5498(3)			<60 fs				17(9)		
5549(3)			330(120) fs						
5558(3)	3		<55 fs		50(10)		50(10)		
5638.0(4)	11^-		9.7(14) ps						
5674(3)	1^+		<50 fs	88Kh04	100				
				88Kh04					
5731(5)									
5785(3)			<35 fs		100				
5816(2)			75(40) fs			34(10)	36(10)		
5931(4)									
5970(4)			<55 fs	88Kh04	100				
				88Kh04					
6115(3)			<140 fs						
6124(5)			55(40) fs		100				
6182(4)			<60 fs		100				
6327(5)									
6432(4)	5^+			88Kh04					
6509(4)									
6559(4)									
6820(60)	5^+			88Kh04					
7146(12)	5^+			88Kh04					
7565(34)				88Kh04					
8510(24)				88Kh04					
		04Ga15		Ref.					

Energy levels and branching ratios [88Kh04, 90En08, 98En04]. Part 3 **$^{33}_{15}$P**

E^*	$2J^\pi$	Branching ratios in percentage			
	E_f^*:	3489.8	3627.6	4047.8	4194
[keV]	$2J_f^\pi$:	5^+	7^+	5^+	5^+
4226.0(3)	7^-	11(2)			
5549(3)					100
5816(2)			30(10)		
6115(3)				44(10)	56(10)

Energy levels and branching ratios [88Kh04, 90En08, 98En04]. Part 4 **$^{33}_{15}$P**

E^*	$2J^\pi$	Branching ratios in percentage		
		E_f^*:	4226.0	5452.6
[keV]		$2J_f^\pi$:	7^-	9^-
5452.6(4)	9^-		100	
5498(3)			83(9)	
5638.0(4)	11^-		54(2)	46(2)

Energy levels and branching ratios [90En08, 98En04]. **$^{34}_{15}$P**

E^*	J^π	$T_{1/2}$ or	Ref.	Branching ratios in percentage		
				E_f^*:	0	429.07
[keV]		Γ_{cm}		J_f^π:	1^+	2^+
0	1^+	12.43(8) s				
429.07(13)	2^+		95Fo16		100	
1607.6(2)	1^+		95Fo16		36(3)	64(3)
2232(6)			95Fo16			
2304.9(3)	$\langle 4^- \rangle$		94Fo04			100
2680(6)						
3090(20)						
3290(20)						
3480(20)						
3560(20)						
4310(20)						
4440(20)						
4740(10)						

Additional data on this isotope can be found in [95Fo16, 94Fo04].