

Energy levels and branching ratios [03Tu08].

⁶⁰Zn₃₀

E^*	J^π	L	σ (τ, n)	S_N	R	σ ($^{12}\text{C}, ^{10}\text{Be}$)	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
[keV]		(τ, n)	$\mu\text{b/sr}$	(τ, n)	(τ, n)	$\mu\text{b/sr}$	Γ_{cm}		E_f^* : 0.0	1004	2193	2559	3510
									J_f^π : 0 ⁺	2 ⁺	4 ⁺	$\langle 2^+ \rangle$	$\langle X^+ \rangle$
0.0	0 ⁺	0	1420(40)	2.40	1.0		2.38(5) m	75Al05					
1004(1)	2 ⁺	2			0.63	3		74Ev02	100				
2193(1)	4 ⁺	4			0.14	3		74Ev02		100			
2559(1)	$\langle 2^+ \rangle$								52(20)	48(20)			
3035(1)										100			
3200(100)													
3510(1)	2 ⁺ , 4 ⁺	3			0.92			74Ev02		88	12		
3627(1)						10		90Bo27		100			
3710(50)	$\langle 4^+ \rangle$												
3808(1)	6 ⁺											100	
3812(1)										100			
3972(1)	2	$\langle 1 \rangle$						72Gr39	70	10	14		6
4180(30)	0 ⁺ , 2 ⁺	$\langle 0, 2 \rangle$						72Gr39					
4200(1)	5 ⁽⁺⁾											67	33
4351(1)	5 ⁽⁺⁾											100	
4400(50)	$\langle 5^- \rangle$					30		90Bo27					
4776(1)	5 ⁽⁺⁾										100		
4852(1)	$\langle 2^+ \rangle$									85(19)		15(8)	
4913(1)	2 ⁺	2						74Ev02		72			28
5200(60)	2 ⁺	2						74Ev02					
5292(1)	8 ⁺												
5300(50)	$\langle 7^- \rangle$					27		90Bo27					
5337(1)	3 ⁺ , 4 ⁺									35			65
5503(1)	2 ⁺	2						74Ev02					
5970(70)													
6360(70)													
6639(1)	0 ⁺	0	400(50)	0.68				74Ev02					34
6950(50)	$\langle 8^+ \rangle$					16		90Bo27					
7130(70)													
7372(2)	4												
7380(30)	0 ⁺	0	650(50)	1.16				74Ev02					
7660(70)													
7980(50)	$\langle 8^+ \rangle$					8		90Bo27					
8300(50)	$\langle 6^+ \rangle$					6		90Bo27					
8475.5(14)	10 ⁺												
8636.1(18)	$\langle 10^+ \rangle$												
8702.1(13)	$\langle 4^+ \rangle$	$\langle 2, 3 \rangle$						74Ev02					
9620.2(19)	$\langle 8^+ \rangle$												
10756.2(18)	$\langle 10^+ \rangle$												
10800(200)													
12131.8(17)	$\langle 12^+ \rangle$												
13200(200)													
13697.8(18)	$\langle 14^+ \rangle$												
15437.1(19)	$\langle 16^+ \rangle$												
17322.6(20)	$\langle 18^+ \rangle$												

(continued)

⁶⁰₃₀Zn

E^*	J^π	L	σ (τ, n)	S_N	R	σ ($^{12}\text{C}, ^{10}\text{Be}$)	$T_{1/2}$ or	Ref.	Branching ratios in percentage					
[keV]		(τ, n)	$\mu\text{b/sr}$	(τ, n)	(τ, n)	$\mu\text{b/sr}$	Γ_{cm}		E_f^* :	0.0	1004	2193	2559	3510
									J_f^π :	0 ⁺	2 ⁺	4 ⁺	$\langle 2^+ \rangle$	$\langle X^+ \rangle$
19352.4(21)	$\langle 20^+ \rangle$													
21596.7(23)	$\langle 22^+ \rangle$													
24131.7(25)	$\langle 24^+ \rangle$													
27007(3)	$\langle 26^+ \rangle$													
30257(3)	$\langle 28^+ \rangle$													
33899(5)	$\langle 30^+ \rangle$													
0+X														
567.3+X														
1575.6+X														
3046+X														
4967+X														
7300+X														
0+Y														
756.6+Y														
2005.0+Y														
3697.0+Y														
5832.7+Y														
8414.4+Y														
			75Al05	75Al05	72Gr39	90Bo27		Ref.						

Additional data on this isotope can be found in [03Ad10, 02Ro39, 00Bu01, 90Bo27, 79We02].

Two-proton transfer reaction ($^{12}\text{C}, ^{10}\text{Be}$) on ^{58}Ni was measured at 10° [90Bo27].

R is the experimental relative magnitude of (τ, n) reaction to be compared with the theoretical estimates [72Gr39].

$T_{1/2}$ and uncertainties in E^* and branching ratios are given in Supplement.

Energy levels and branching ratios [03Tu08]. Part 2

⁶⁰₃₀Zn

E^*	J^π	Branching ratios in percentage											
[keV]		E_f^* :	3808.4	3811.8	3972.3	4199.9	4913.1	5291.9	6639.1	8475.5	8636.1	9620.2	
		J_f^π :	6 ⁺		2	5 ⁽⁺⁾	2 ⁺	8 ⁺	0 ⁺	10 ⁺	$\langle 10^+ \rangle$	$\langle 8^+ \rangle$	
5292(1)	8 ⁺		100										
5503(1)	2 ⁺				100								
6639(1)	0 ⁺					47	19						
7372(2)	4				100								
8475.5(14)	10 ⁺							100					
8636.1(18)	$\langle 10^+ \rangle$							100					
8702.1(13)	$\langle 4^+ \rangle$					30			70				
9620.2(19)	$\langle 8^+ \rangle$			100									
10756.2(18)	$\langle 10^+ \rangle$							38(7)				62(6)	
12131.8(17)	$\langle 12^+ \rangle$									33(2)	6.8(12)		

Energy levels and branching ratios [03Tu08]. Part 3

⁶⁰₃₀Zn

E^*	J^π	Branching ratios in percentage										
		E_f^* :	10756.2	12131.8	13697.8	15437.1	17322.6	19352.4	21596.7	24131.7	27007	30257
[keV]		J_f^π :	$\langle 10^+ \rangle$	$\langle 12^+ \rangle$	$\langle 14^+ \rangle$	$\langle 16^+ \rangle$	$\langle 18^+ \rangle$	$\langle 20^+ \rangle$	$\langle 22^+ \rangle$	$\langle 24^+ \rangle$	$\langle 26^+ \rangle$	$\langle 28^+ \rangle$
12131.8(17)	$\langle 12^+ \rangle$		61(4)									
13697.8(18)	$\langle 14^+ \rangle$			100								
15437.1(19)	$\langle 16^+ \rangle$				100							
17322.6(20)	$\langle 18^+ \rangle$					100						
19352.4(21)	$\langle 20^+ \rangle$						100					
21596.7(23)	$\langle 22^+ \rangle$							100				
24131.7(25)	$\langle 24^+ \rangle$								100			
27007(3)	$\langle 26^+ \rangle$									100		
30257(3)	$\langle 28^+ \rangle$										100	
33899(5)	$\langle 30^+ \rangle$											100

Energy levels and branching ratios [03Tu08]. Part 4

⁶⁰₃₀Zn

E^*	J^π	Branching ratios in percentage									
[keV]	E_f^* : J_f^π :	0+X	567.3+X	1576+X	3046+X	4967+X	0+Y	756.6+Y	2005+Y	3697+Y	5833+Y
567.3+X		100									
1575.6+X			100								
3046+X				100							
4967+X					100						
7300+X						100					
756.6+Y							100				
2005.0+Y								100			
3697.0+Y									100		
5832.7+Y										100	
8414.4+Y											100

Energy levels and branching ratios [99Bh04].

⁶¹₃₀Zn

E^*	$2J^\pi$	$2T$	L	$T_{1/2}$ or	Ref.	Branching ratios in percentage					
[keV]			($^{16}\text{O}, ^{13}\text{C}$)	Γ_{cm}		E_{f}^* : $2J_{\text{f}}^\pi$:	0	88.4	124	418	756
						3 ⁻	1 ⁻	5 ⁻	3 ⁻	5 ⁻	
0	3 ⁻	1	1	89.1(2) s	83OkZY						
88.4(1)	1 ⁻			<430 ms			100				
123.8(1)	5 ⁻						100				
418.1(2)	3 ⁻		1	0.14(7) s	83OkZY		75(2)	15(2)	10(2)		
756.0(2)	5 ⁻			<0.13 s			41(2)		3(1)	56	
937.7(4)	1 ⁻		3		83OkZY		26(5)	13(2)		61	
996.0(2)	7 ⁻						22(3)		74	4	

(continued)

⁶¹Zn
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E^*	$2J^\pi$	$2T$	L	$T_{1/2}$ or	Ref.	Branching ratios in percentage					
[keV]			($^{16}\text{O}, ^{13}\text{C}$)	Γ_{cm}		E_{f}^* : $2J_{\text{f}}^\pi$:	0 3 $^-$	88.4 1 $^-$	124 5 $^-$	418 3 $^-$	756 5 $^-$
1264.8(2)	9 $^-$								100		
1362.3(4)	3 $^-$, 5 $^-$						51		24	17(3)	7(1)
1402.2(3)	7 $^-$						18(4)		9(2)	17(4)	56
1657.3(6)	5 $^-$, 7 $^-$								28(5)	72	
2000.9(3)	9 $^-$										53
2030(10)											
2099(1)									100		
2198(20)											
2250(10)											
2269.6(9)											
2399.8(8)	$\langle 9^- \rangle$								x		
2440	7 $^-$										
2520(10)											
2646(20)											
2710(10)											
2770	9 $^+$		4		83OkZY						
2797(1)											
3090(10)											
3245.5(9)	$\langle 13^- \rangle$										
3300(10)											
3337(1)	$\langle 13^- \rangle$										
3380	3 $^-$										
3645(20)		3	1		83OkZY						
3880(60)											
4262	$\langle 15 \rangle$										
4380(80)											
4415	$\langle 17^- \rangle$										
4646.1(14)	$\langle 17^- \rangle$										
4670(30)											
5100(30)											
5320(30)											
5551	$\langle 19 \rangle$										
5590(90)											
6090	$\langle 21 \rangle$										
7292											
7488.7(20)											
7628											
9163											
9990(70)	3 $^-$	5	1		83OkZY						
11368	$\langle 25 \rangle$										
12800	$\langle 29 \rangle$										
14426	$\langle 33 \rangle$										
16272	$\langle 37 \rangle$										
18354	$\langle 41 \rangle$										
20661	$\langle 45 \rangle$										

(continued)

⁶¹₃₀Zn

E^*	$2J^\pi$	$2T$	L	$T_{1/2}$ or Ref.	E_f^* :	Branching ratios in percentage				
[keV]			(¹⁶ O, ¹³ C)	Γ_{cm}	$2J_f^\pi$:	0	88.4	124	418	756
						3 ⁻	1 ⁻	5 ⁻	3 ⁻	5 ⁻
23206	$\langle 49 \rangle$									
26024	$\langle 53 \rangle$									
29151	$\langle 57 \rangle$									
32617	$\langle 61 \rangle$									

Additional data on this isotope can be found in [04Iz01, 99Oi01, 79We02].

Energy levels and branching ratios [99Bh04]. Part 2

⁶¹₃₀Zn

E^*	$2J^\pi$	E_f^* :	996.0	1264.8	2269.6	2399.8	2796.8	3245.5	3337	4262	4415	5551
[keV]		$2J_f^\pi$:	7 ⁻	9 ⁻		$\langle 9^- \rangle$		$\langle 13^- \rangle$	$\langle 13^- \rangle$	$\langle 15 \rangle$	$\langle 17^- \rangle$	$\langle 19 \rangle$
2000.9(3)	9 ⁻		47(13)									
2269.6(9)			95	5.0								
2399.8(8)	$\langle 9^- \rangle$		100									
2797(1)				100								
3245.5(9)	$\langle 13^- \rangle$			x								
3337(1)	$\langle 13^- \rangle$				x	100						
4262	$\langle 15 \rangle$						x	x				
4415	$\langle 17^- \rangle$								x			
4646.1(14)	$\langle 17^- \rangle$						x					
5551	$\langle 19 \rangle$									x		
6090	$\langle 21 \rangle$										x	
7292												x

Energy levels and branching ratios [99Bh04]. Part 3

⁶¹₃₀Zn

E^*	$2J^\pi$	E_f^* :	6090	7628	11368	12800	14426	16272	18354	20661	23206	26024	29151
[keV]		$2J_f^\pi$:	$\langle 21 \rangle$		$\langle 25 \rangle$	$\langle 29 \rangle$	$\langle 33 \rangle$	$\langle 37 \rangle$	$\langle 41 \rangle$	$\langle 45 \rangle$	$\langle 49 \rangle$	$\langle 53 \rangle$	$\langle 57 \rangle$
7488.7(20)			x										
7628			x										
9163				x									
11368	$\langle 25 \rangle$		x										
12800	$\langle 29 \rangle$			x	x								
14426	$\langle 33 \rangle$					x							
16272	$\langle 37 \rangle$						x						
18354	$\langle 41 \rangle$							x					
20661	$\langle 45 \rangle$								x				
23206	$\langle 49 \rangle$									x			

(continued)

⁶¹₃₀Zn

E^*	$2J^\pi$	Branching ratios in percentage										
[keV]	$E_f^*:$ $2J_f^\pi:$	6090 ⟨21⟩	7628	11368 ⟨25⟩	12800 ⟨29⟩	14426 ⟨33⟩	16272 ⟨37⟩	18354 ⟨41⟩	20661 ⟨45⟩	23206 ⟨49⟩	26024 ⟨53⟩	29151 ⟨57⟩
26024	⟨53⟩									x		
29151	⟨57⟩										x	
32617	⟨61⟩											x

Energy levels and branching ratios [99Si11, 00Hu18].

⁶²₃₀Zn

E^*	J^π	L	S_N	S_N	S_N	σ (¹² C, ¹⁰ Be)	L	σ (p,t)	N	$T_{1/2}$ or	Ref.
[keV]		(⁶ Li,d)	rel.	(⁷ Li,t)	(¹⁶ O, ¹² C)	μ b/sr	(p,t)	μ b/sr	(p,t)	Γ_{cm}	
0.0	0 ⁺	0	1.0	1.0*	1.0		0	911	490	9.186(13) h	77Fu03
954.0(4)	2 ⁺	2	0.36	0.28	0.21	19	2	150	197	2.91(21) ps	77Fu03
1804.7(4)	2 ⁺	2	0.016	0.004			2	19	23	2.63(42) ps	77Fu03
2186.1(5)	4 ⁺	4	0.055	0.04	0.13		4	2.6	15	0.53(+24-14) ps	77Fu03
2330(10)	0 ⁺	0	0.12	<0.1			0	1.5	0.7		77Fu03
2384.5(4)	3 ⁺										
2743.5(4)	4 ⁺		weak					23	130	2.36(21) ps	77Fu03
2810(10)	2 ⁺						2	43	49		74Hi05
2890(10)	2 ⁺						2	16	18		74Hi05
3060(10)	2 ⁺						2	4.3	4.9		74Hi05
3160(10)	[2 ⁺]							11	13		74Hi05
3209.2(13)	3 ⁻	3	0.39	0.27	0.70		3	39			77Fu03
3310(50)	⟨4 ⁺ ⟩					116					90Bo27
3350(20)								2.0			74Hi05
3470(10)	2 ⁺	⟨2⟩	0.004				2	19	21		77Fu03
0+X	$J \approx \langle 18 \rangle$										
3586.2(7)	⟨5 ⁺ ⟩						⟨2⟩	5.6	6.1	0.63(+63-21) ps	74Hi05
3640(10)	2 ⁺	⟨2⟩	0.003				2	4.4	4.8		77Fu03
3707.5(6)	6 ⁺									0.25(+17-7) ps	
3730(10)							4.3	1.9			74Hi05
3830(10)	2 ⁺						2	13	14		74Hi05
3870(30)	1 ⁻	1	0.43	0.30	0.55						77Fu03
3920(10)		[1]	0.50								77Fu03
4000(10)	0 ⁺						0	6.1	1.5		74Hi05
4042.6(8)	⟨5 ⁻ ⟩			0.10	0.19					0.7(+1-5) ps	76Ma12
4090(10)	⟨4 ⁺ ⟩						⟨4⟩	3.8			74Hi05
4220(10)	⟨3 ⁻ ⟩					141	⟨3⟩	11			74Hi05
4330(20)	[2 ⁺]							4.3			74Hi05
4347.8(6)	⟨6 ⁺ ⟩							3.3		0.28(+28-14) ps	74Hi05
4380(20)	⟨4 ⁺ ⟩						⟨4⟩				74Hi05
4440(20)											
4500(20)	6 ⁺	6	0.20			47					77Fu03
4535					0.22						76Ma12

(continued)

⁶²₃₀Zn

E^*	J^π	L	S_N	S_N	S_N	σ (¹² C, ¹⁰ Be)	L	σ (p,t)	N	$T_{1/2}$ or	Ref.
[keV]		(⁶ Li,d)	rel.	(⁷ Li,t)	(¹⁶ O, ¹² C)	$\mu\text{b/sr}$	(p,t)	$\mu\text{b/sr}$	(p,t)	Γ_{cm}	
4600	$\langle 7^- \rangle$										
4620(20)	$\langle 0^+ \rangle$						$\langle 0 \rangle$	10			74Hi05
4680(10)	4^+						4	4.3			74Hi05
4810(30)											
4860(30)								3.9			74Hi05
4904.1(8)	$\langle 7^- \rangle$							5.6		8.3(35) ps	74Hi05
4910(30)		$\langle 5 \rangle$	0.10								78Be25
5050(30)											
5090(20)	$\langle 1^- \rangle$	1	0.15								77Fu03
5122.8(9)	$\langle 5,7 \rangle$										
5130.4(9)	$\langle 6^- \rangle$										
5142.9(10)	$\langle 7^+ \rangle$									0.42(+21-14) ps	
5190(30)						171					90Bo27
5240(20)											
5340(30)	0^+										
5370(20)	$\langle 4^+ \rangle$						$\langle 4 \rangle$				
5470											
5482.7(14)	$\langle 8^+ \rangle$									0.28(+14-7) ps	
1992.7+X	$J+2$										
5560(20)											
5700(30)											
6081.0(9)	$\langle 9^- \rangle$										
6112.8(11)	$\langle 8^- \rangle$										
6300(50)	$\langle 8^+ \rangle$										
6628.8(22)											
7200											
7400											
7422.6(11)	$\langle 11^- \rangle$										
7423(2)	$\langle 10^- \rangle$										
7500(1)	$\langle 10^+ \rangle$										
7540(50)	$\langle 8^+ \rangle$					106					90Bo27
7630(1)											
7701.8											
4208.1+X	$J+4$										
7976(1)	$\langle 9^+ \rangle$										
8300(50)	$\langle 6^+ \rangle$					30					90Bo27
8438(1)	$\langle 10^+ \rangle$										
9049(1)	$\langle 11^+ \rangle$										
9215(1)	$\langle 13^- \rangle$										
9466(1)	$\langle 12^+ \rangle$										
9800											
6647.6+X	$J+6$										
10247(1)	$\langle 11^+ \rangle$										
10300											
10317(1)	$\langle 13^+ \rangle$										

(continued)

⁶²₃₀Zn

E^*	J^π	L	S_N	S_N	S_N	σ (¹² C, ¹⁰ Be)	L	σ (p,t)	N	$T_{1/2}$ or	Ref.
[keV]		(⁶ Li,d)	rel.	(⁷ Li,t)	(¹⁶ O, ¹² C)	$\mu\text{b/sr}$	(p,t)	$\mu\text{b/sr}$	(p,t)	Γ_{cm}	
10375(1)	$\langle 14^+ \rangle$										
10636(1)	$\langle 12^+ \rangle$										
10800											
11183(1)	$\langle 13^+ \rangle$										
11655(1)	$\langle 13^- \rangle$										
11756(1)	$\langle 14^+ \rangle$										
11962(1)	$\langle 16^+ \rangle$										
12333(1)	$\langle 14^- \rangle$										
12537(1)	$\langle 15^+ \rangle$										
12815(1)	$\langle 15^- \rangle$										
9337.4+X	$J+8$										
12997(1)	$\langle 15^- \rangle$										
13237(1)	$\langle 16^+ \rangle$										
13400											
13731(1)	$\langle 16^- \rangle$										
14125(1)	$\langle 17^+ \rangle$										
14447(1)	$\langle 17^- \rangle$										
14546(1)	$\langle 17^- \rangle$										
15049(1)	$\langle 18^+ \rangle$										
15420(1)	$\langle 18^- \rangle$										
15707(2)	$\langle 19^- \rangle$										
12276.6+X	$J+10$										
16373(1)	$\langle 19^+ \rangle$										
16379(1)	$\langle 19^- \rangle$										
17485(1)	$\langle 20^- \rangle$										
17590(1)	$\langle 20^+ \rangle$										
18509(1)	$\langle 21^- \rangle$										
15512+X	$J+12$										
19507(2)	$\langle 21^+ \rangle$										
19684(1)	$\langle 22^- \rangle$										
21046(1)	$\langle 23^- \rangle$										
23190(2)	$\langle 24^- \rangle$										
			77Fu03	78Be25	76Ma12	90Bo27		74Hi05		74Hi05	Ref.

Additional data on this isotope can be found in [03Hy02, 02Le17, 90Bo27].

* Absolute value $S_N=0.210$ was obtained in [80Cu06, 00Hu18]; relative values are from [78Be25].

Relative values S_N for nuclear cluster transfer reactions (⁶Li,d), (⁷Li,t) and (¹⁶O, ¹²C) given in [77Fu03, 78Be25], [80Cu06] and [76Ma12], correspondingly, are discussed in [00Hu18].

Two-neutron pickup reaction data L [00Hu18], σ (p,t) and normalization factor $N=(2J+1)d\sigma/d\Omega_{exp}/9.72\sigma_{DWBA}$ are from [74Hi05]; energy resolution is about 20 keV, see [00Hu18].

Two-proton transfer reaction (¹²C, ¹⁰Be) on ⁶⁰Ni was measured at 10° [90Bo27].

Cross sections and $S_N=\sigma(exp)/\sigma(DWBA)$ for the ground state and the level at $E^*=5390$ keV were determined in [75Al05] as 980(30) $\mu\text{b/sr}$, 2.00 and 380(50) $\mu\text{b/sr}$, 0.59, respectively.

Energy levels and branching ratios [99Si11, 00Hu18]. Part 2

⁶²Zn
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E^*	J^π	E_f^* :	0.0	954	1805	Branching ratios in percentage					0+X	3586.2	3707.5
[keV]		J_f^π :	0 ⁺	2 ⁺	2 ⁺	2186	2384	2743	3209		$J \approx \langle 18 \rangle$	$\langle 5^+ \rangle$	6 ⁺
954.0(4)	2 ⁺		100										
1804.7(4)	2 ⁺		39	61									
2186.1(5)	4 ⁺			100									
2384.5(4)	3 ⁺			x	x								
2743.5(4)	4 ⁺				39(9)	55(13)	6(2)						
3209.2(13)	3 ⁻					100							
3586.2(7)	$\langle 5^+ \rangle$					x	44(3)	56(3)					
3707.5(6)	6 ⁺					100							
4042.6(8)	$\langle 5^- \rangle$					57(3)		27(3)	15(2)				
4347.8(6)	$\langle 6^+ \rangle$							93(6)				x	7(1)
4535						x							
4904.1(8)	$\langle 7^- \rangle$												61(2)
5142.9(10)	$\langle 7^+ \rangle$											100	
5482.7(14)	$\langle 8^+ \rangle$												100
1992.7+X	$J+2$									≈ 36.4		63.6	

Energy levels and branching ratios [99Si11, 00Hu18]. Part 3

⁶²Zn
₃₀

E^*	J^π	E_f^* :	4042.6	4347.8	4535	Branching ratios in percentage					5482.7	1993+X	6081.0
[keV]		J_f^π :	$\langle 5^- \rangle$	$\langle 6^+ \rangle$		4904.1	5122.8	5130.4	5142.9		$\langle 8^+ \rangle$	$J+2$	$\langle 9^- \rangle$
4904.1(8)	$\langle 7^- \rangle$		x	39(9)	x								
5122.8(9)	$\langle 5, 7 \rangle$		100										
5130.4(9)	$\langle 6^- \rangle$		100										
5142.9(10)	$\langle 7^+ \rangle$			x									
6081.0(9)	$\langle 9^- \rangle$					100							
6112.8(11)	$\langle 8^- \rangle$					100		x					
6628.8(22)							100						
7422.6(11)	$\langle 11^- \rangle$												100
7500(1)	$\langle 10^+ \rangle$									x			
7630(1)													x
4208.1+X	$J+4$											100	
7976(1)	$\langle 9^+ \rangle$								x				
8438(1)	$\langle 10^+ \rangle$												x

Energy levels and branching ratios [99Si11, 00Hu18]. Part 4

 $^{62}_{30}\text{Zn}$

E^*	J^π	Branching ratios in percentage									
[keV]	E_f^* : J_f^π :	6112.8 $\langle 8^- \rangle$	7423 $\langle 10^- \rangle$	7500 $\langle 10^+ \rangle$	7630 $J+4$	4208+X $\langle 9^+ \rangle$	7976 $\langle 9^+ \rangle$	8438 $\langle 10^+ \rangle$	9049 $\langle 11^+ \rangle$	9215 $\langle 13^- \rangle$	9466 $\langle 12^+ \rangle$
7423(2)	$\langle 10^- \rangle$	x									
9049(1)	$\langle 11^+ \rangle$						x	x			
9215(1)	$\langle 13^- \rangle$		x								
9466(1)	$\langle 12^+ \rangle$		x					x	x		
6647.6+X	$J+6$					100					
10247(1)	$\langle 11^+ \rangle$			x							
10317(1)	$\langle 13^+ \rangle$								x		x
10375(1)	$\langle 14^+ \rangle$									x	x
10636(1)	$\langle 12^+ \rangle$		x		x						
11655(1)	$\langle 13^- \rangle$		x								
12333(1)	$\langle 14^- \rangle$									x	

Energy levels and branching ratios [99Si11, 00Hu18]. Part 5

 $^{62}_{30}\text{Zn}$

E^*	J^π	Branching ratios in percentage									
[keV]	$E_f^*:$ $J_f^\pi:$	6648+X $J+6$	10247 $\langle 11^+ \rangle$	10375 $\langle 14^+ \rangle$	10636 $\langle 12^+ \rangle$	11183 $\langle 13^+ \rangle$	11655 $\langle 13^- \rangle$	11756 $\langle 14^+ \rangle$	11962 $\langle 16^+ \rangle$	12333 $\langle 14^- \rangle$	12537 $\langle 15^+ \rangle$
10636(1)	$\langle 12^+ \rangle$		x								
11183(1)	$\langle 13^+ \rangle$		19(2)		81(5)						
11756(1)	$\langle 14^+ \rangle$				39(2)	61(4)					
11962(1)	$\langle 16^+ \rangle$			x							
12333(1)	$\langle 14^- \rangle$						100				
12537(1)	$\langle 15^+ \rangle$					40(3)		60(4)			
12815(1)	$\langle 15^- \rangle$			x							
9337.4+X	$J+8$	100									
12997(1)	$\langle 15^- \rangle$						49(12)			51(4)	
13237(1)	$\langle 16^+ \rangle$							53(3)			47(3)
13731(1)	$\langle 16^- \rangle$									43(3)	
14125(1)	$\langle 17^+ \rangle$										44(3)
14447(1)	$\langle 17^- \rangle$								x		
14546(1)	$\langle 17^- \rangle$								x		

Energy levels and branching ratios [99Si11, 00Hu18]. Part 6

 $^{62}_{30}\text{Zn}$

E^*	J^π	Branching ratios in percentage										
		E_f^* :	12815	9337+X	12997	13237	13731	14125	14447	14546	15049	15420
[keV]		J_f^π :	$\langle 15^- \rangle$	$J+8$	$\langle 15^- \rangle$	$\langle 16^+ \rangle$	$\langle 16^- \rangle$	$\langle 17^+ \rangle$	$\langle 17^- \rangle$	$\langle 17^- \rangle$	$\langle 18^+ \rangle$	$\langle 18^- \rangle$
13731(1)	$\langle 16^- \rangle$				57(5)							
14125(1)	$\langle 17^+ \rangle$					56(3)						

(continued)

 $^{62}_{30}\text{Zn}$

E^*	J^π	Branching ratios in percentage									
[keV]	E_f^* : J_f^π :	12815 $\langle 15^- \rangle$	9337+X $J+8$	12997 $\langle 15^- \rangle$	13237 $\langle 16^+ \rangle$	13731 $\langle 16^- \rangle$	14125 $\langle 17^+ \rangle$	14447 $\langle 17^- \rangle$	14546 $\langle 17^- \rangle$	15049 $\langle 18^+ \rangle$	15420 $\langle 18^- \rangle$
14447(1)	$\langle 17^- \rangle$	x				x					
14546(1)	$\langle 17^- \rangle$			48(4)		52(4)					
15049(1)	$\langle 18^+ \rangle$				57(3)		43(3)				
15420(1)	$\langle 18^- \rangle$					56(4)			44(4)		
15707(2)	$\langle 19^- \rangle$							x			
12276.6+X	$J+10$		100								
16373(1)	$\langle 19^+ \rangle$						52(6)			48(6)	
16379(1)	$\langle 19^- \rangle$							x	55(4)		45(12)
17485(1)	$\langle 20^- \rangle$										68(5)
17590(1)	$\langle 20^+ \rangle$									75(8)	

Energy levels and branching ratios [99Si11, 00Hu18]. Part 7

 $^{62}_{30}\text{Zn}$

E^* [keV]	J^π	Branching ratios in percentage								
		$E_f^*:$ $J_f^\pi:$	12277+X $J+10$	16373 $\langle 19^+ \rangle$	16379 $\langle 19^- \rangle$	17485 $\langle 20^- \rangle$	18509 $\langle 21^- \rangle$	19684 $\langle 22^- \rangle$	21046 $\langle 23^- \rangle$	7422.8
7701.8										x
17485(1)	$\langle 20^- \rangle$				32(3)					
17590(1)	$\langle 20^+ \rangle$			25(5)						
18509(1)	$\langle 21^- \rangle$				64(7)	36(4)				
15512+X	$J+12$		100							
19507(2)	$\langle 21^+ \rangle$			100						
19684(1)	$\langle 22^- \rangle$					71(6)	29(14)			
21046(1)	$\langle 23^- \rangle$						64(7)	36(4)		
23190(2)	$\langle 24^- \rangle$							71(14)	29(7)	

Energy levels and branching ratios [01Ba27].

 $^{63}_{30}\text{Zn}$

E^*	$2J^\pi$	L	C^2S	σ (p,d)	L	C^2S	L	C^2S	$T_{1/2}$ or	Ref.
[keV]			(p,d)	$\mu\text{b/sr}$		(d,t)		(τ, α)	Γ_{cm}	
0	3^-	1	1.3	2100	1	1.00	1	1.3*	38.5(1) m	78Me17
192.92(4)	5^-	3	2.9	370	3	1.73	3	3.1*	0.5(1) ns	78Me17
247.84(5)	1^-	1	0.21	incl	1	0.12			33(8) ps	77Br27
627.11(6)	1^-	1	0.38	650						78Me17
637.07(6)	3^-		incl	incl			1	0.85*	>0.5 ps	78Me17
650.10(4)	5^-			incl					>0.3 ps	
1023.22(5)	3^-	1	0.38	120					>3.5 ps	78Me17
1063.35(7)	7^-	3	0.37				3	0.32	>0.3 ps	78Me17

(continued)

⁶³₃₀Zn

E^*	$2J^\pi$	L	C^2S	σ (p,d)	L	C^2S	L	C^2S	$T_{1/2}$ or	Ref.
[keV]			(p,d)	$\mu\text{b/sr}$		(d,t)		(τ, α)	Γ_{cm}	
1065.28(12)	1^-	1	0.21				1	0.2	>0.2 ps	78Me17
1206.37(7)	7^-	3	0.63	40			3	0.27	>0.4 ps	78Me17
1284.26(6)	5^-	$\langle 3 \rangle$							>0.4 ps	78Me17
1395.44(10)	3^-	$\langle 1 \rangle$							0.10(2) ps	78Me17
1420	$1^-, 3^-$	1	0.06	40						68Jo16
1436.26(11)	9^-								0.69(21) ps	
1664.86(9)	7^-	3	0.62	120			3	0.8	0.24(+6-5) ps	68Jo16
1691.22(9)	5^-		incl	incl					0.07(1) ps	68Jo16
1702.93(14)	9^+								32(4) ps	
1704(15)	$5^-, 7^-$						3	0.78		67Bo39
1860.85(14)	9^-								0.43(+16-11) ps	
1909.26(14)	X^-	1	0.09	40			1	0.15	>0.3 ps	68Jo16
1978.40(19)	X^-								0.19(+7-5) ps	
2050.46(19)	9^-								>0.3 ps	
2158.10(22)	3^-	1	0.07						0.028(+14-10) ps	68Jo16
2233.31(23)	11^-								>1.4 ps	
2249.2(4)	X^-								0.12(3) ps	
2261.53(17)	3^-								0.07(+3-2) ps	
2288.31(17)	7^-								>0.2 ps	
2291.46(15)	3^-								0.06(+3-2) ps	
2293.0(3)	$\langle 3^- \rangle$								0.030(+15-10) ps	
2319.0(4)	11^-								0.35(9) ps	
2377.84(25)	9^+								>1.4 ps	
2403.28(19)									0.11(+7-4) ps	
2521.15(15)	3^-	1	0.06							68Jo16
2584.2(4)	13^+								3.54(28) ps	
2600.1(3)	1^--5^-									
2609.1(4)										
2634.53(22)	7^-	3	0.81	40			3	1.1	0.19(5) ps	68Jo16
2690.9(10)										
2750.7(4)	$\langle 5,7 \rangle^-$	3	0.18				3	0.25*		68Jo16
2826.2(5)	11^+								291(90) fs	
2850	$\langle 5,7 \rangle^-$	3	0.20				3	0.13*		68Jo16
2911.9(5)	9								>1.4 ps	
2933.5(6)	13^-								215(62) fs	
2940	$\langle 5,7 \rangle^-$						3	0.13*		67Be18
3010	$\langle 5,7 \rangle^-$	3	0.24				3	0.27*		68Jo16
3380	$\langle 5,7 \rangle^-$	3	0.51				3	0.43*		68Jo16
3481.0(7)	13^+									
3528.0(6)	13^-									
3763.5(6)	$\langle 17^+ \rangle$									
3770.4(7)	$\langle 15 \rangle^+$									
3891.6(9)										
≈ 4000	$\langle 1,3 \rangle^-$	1	0.01				$\langle 1 \rangle$	0.12		68Jo16
4320	$\langle 5,7 \rangle^-$	3	0.28				$\langle 3 \rangle$	0.33		68Jo16

(continued)

⁶³₃₀Zn

E^*	$2J^\pi$	L	C^2S	σ (p,d)	L	C^2S	L	C^2S	$T_{1/2}$ or	Ref.
[keV]			(p,d)	$\mu\text{b/sr}$		(d,t)		(τ, α)	Γ_{cm}	
4355.3(7)	$\langle 15 \rangle^-$									
4800	$\langle 5,7 \rangle^-$	3	0.19							68Jo16
4902.9(9)										
5077.0(7)	$\langle 19 \rangle^+$									
5346.1(9)	$\langle 21 \rangle^+$								<280 fs	
≈ 5400	$\langle 1,3 \rangle^-$	$\langle 1 \rangle$	0.24							68Jo16
5406.6(7)	17^-									
5424.2(6)	17^-									
5916.4(7)	19^-									
≈ 6000	1^-						1	0.37		67Bo39
6234.5(7)	21^-									
≈ 6300	5^-									
6488.0(13)	$\langle 23 \rangle^+$									
6570.7(8)	$23^{(-)}$									
≈ 6700	$\langle 5,7 \rangle^-$	3	0.28				3	0.69		68Jo16
≈ 7200	$\langle 5,7 \rangle^-$	3	0.35				3	0.62		68Jo16
7611.5(12)	25^-									
7927.7(13)	$27^{(-)}$									
9097.6(16)	$\langle 29 \rangle^-$									
9774.7(17)	$\langle 31 \rangle^-$									
			78Me17 68Jo16	66Mc15		77Br27 01Ba27		67Be18 67Fo05		Ref. Ref.

Additional data on this isotope can be found in [67Fo05].

* Values C^2S from [67Be18] were reduced by 50% in the recent evaluation [01Ba27].The reactions (p,d), (d,t) and (τ, α) correspond to neutron pickup (parameter S_n^-); they were evaluated in the recent review [01Ba27]; cross sections σ (p,d) are from [66Mc15].

Energy levels and branching ratios [01Ba27]. Part 2

⁶³₃₀Zn

E^*	$2J^\pi$	Branching ratios in percentage										
		E_f^* :	0	193	248	627	637	650	1023	1063	1206.4	1436.3
[keV]		$2J_f^\pi$:	3^-	5^-	1^-	1^-	3^-	5^-	3^-	7^-	7^-	9^-
192.92(4)	5^-		100									
247.84(5)	1^-		100									
627.11(6)	1^-		100									
637.07(6)	3^-		96.0(4)		4.0(4)							
650.10(4)	5^-		86(1)	14(1)								
1023.22(5)	3^-		27(1)		28(2)	7		39(2)				
1063.35(7)	7^-		66(1)	16(1)				18(1)				
1065.28(12)	1^-		91.3(6)	4.8(4)				3.8(4)				
1206.37(7)	7^-		51(2)	47(2)				2.2(2)				
1284.26(6)	5^-		6(1)	58(2)	28(1)			8(1)				

(continued)

⁶³₃₀Zn

E^* [keV]	$2J^\pi$	Branching ratios in percentage										
		$E_f^*:$ $2J_f^\pi:$	0 3 ⁻	193 5 ⁻	248 1 ⁻	627 1 ⁻	637 3 ⁻	650 5 ⁻	1023 3 ⁻	1063 7 ⁻	1206.4 7 ⁻	1436.3 9 ⁻
1395.44(10)	3 ⁻		70(1)	4.0(5)	7(1)	19(1)						
1436.26(11)	9 ⁻			100								
1664.86(9)	7 ⁻		15(1)	60(2)			12(1)	13(1)				
1691.22(9)	5 ⁻		84.6(1)	10.1(7)			5.3(7)					
1702.93(14)	9 ⁺									85(2)	15(2)	
1860.85(14)	9 ⁻			15(2)				61(2)		23(1)		
1909.26(14)	X ⁻		71(1)	23(1)			6.8(5)					
1978.40(19)	X ⁻			74(2)				26(2)				
2050.46(19)	9 ⁻									61(3)	39(3)	
2158.10(22)	3 ⁻				60(2)	40(2)						
2233.31(23)	11 ⁻									42(2)		20(2)
2249.2(4)	X ⁻							29(2)		71(2)		
2261.53(17)	3 ⁻		26(2)			74(2)						
2288.31(17)	7 ⁻							68(2)			32(2)	
2291.46(15)	3 ⁻				27(2)		39(2)	34(2)				
2293.0(3)	⟨3 ⁻ ⟩				100							
2319.0(4)	11 ⁻									100		
2403.28(19)						35(5)			65(5)			
2521.15(15)	3 ⁻							49(4)		51(4)		
2600.1(3)	1 ⁻ –5 ⁻		13(3)		44(4)			43(4)				
2609.1(4)			38(5)				17(5)	45(5)				
2634.53(22)	7 ⁻			55(3)							45(3)	
2690.9(10)					100							
2750.7(4)	⟨5,7⟩ ⁻			46(8)				54(8)				
2911.9(5)	9									100		
2933.5(6)	13 ⁻											100

Energy levels and branching ratios [01Ba27]. Part 3

⁶³₃₀Zn

E^* [keV]	$2J^\pi$	Branching ratios in percentage										
		$E_f^*:$ $2J_f^\pi:$	1664.9 7 ⁻	1702.9 9 ⁺	2051 9 ⁻	2319 11 ⁻	2584.2 13 ⁺	2826.2 11 ⁺	2933.5 13 ⁻	3481.0 13 ⁺	3528.0 13 ⁻	3763.5 ⟨17 ⁺ ⟩
2233.31(23)	11 ⁻		38(1)									
2377.84(25)	9 ⁺			100								
2584.2(4)	13 ⁺			100								
2826.2(5)	11 ⁺			100								
3481.0(7)	13 ⁺			100				x				
3528.0(6)	13 ⁻				42(2)	58(4)						
3763.5(6)	⟨17 ⁺ ⟩						100					
3770.4(7)	⟨15 ⁺ ⟩						56(1)	44(3)				
3891.6(9)							100					
4355.3(7)	⟨15⟩ ⁻					x	44(24)			6.6(7)		50(24)

(continued)

⁶³₃₀Zn

E^*	$2J^\pi$	Branching ratios in percentage										
[keV]		E_f^* : $2J_f^\pi$:	1664.9 7 ⁻	1702.9 9 ⁺	2051 9 ⁻	2319 11 ⁻	2584.2 13 ⁺	2826.2 11 ⁺	2933.5 13 ⁻	3481.0 13 ⁺	3528.0 13 ⁻	3763.5 ⟨17 ⁺ ⟩
4902.9(9)												100
5077.0(7)	⟨19⟩ ⁺											70(4)
5346.1(9)	⟨21⟩ ⁺											100
5406.6(7)	17 ⁻								22(5)		78(5)	
5424.2(6)	17 ⁻								5(2)		53(3)	41(3)

Energy levels and branching ratios [01Ba27]. Part 4

⁶³₃₀Zn

E^*	$2J^\pi$	Branching ratios in percentage								
[keV]	E_f^* : $2J_f^\pi$:	3770.4 $\langle 15 \rangle^+$	3891.6	4355.3 $\langle 15 \rangle^-$	4902.9	5077.0 $\langle 19 \rangle^+$	5346.1 $\langle 21 \rangle^+$	5406.6 17^-	5424.2 17^-	
5077.0(7)	$\langle 19 \rangle^+$	30.1(15)	x							
5916.4(7)	19^-			49(3)	x			23(3)	28(2)	
6234.5(7)	21^-					41(2)	3.8(3)	20(2)	22(1)	
6488.0(13)	$\langle 23 \rangle^+$					100				
6570.7(8)	$23^{\langle - \rangle}$						83(4)			

Energy levels and branching ratios [01Ba27]. Part 5

⁶³₃₀Zn

E^*	$2J^\pi$	Branching ratios in percentage					
[keV]		E_f^* : $2J_f^\pi$:	5916.4 19 ⁻	6234.5 21 ⁻	6570.7 23 ^{⟨-⟩}	7611.5 25 ⁻	7927.7 27 ^{⟨-⟩}
6234.5(7)	21 ⁻		12(1)				
6570.7(8)	23 ^{⟨-⟩}		8.7(5)	8.4(5)			
7611.5(12)	25 ⁻			100			
7927.7(13)	27 ^{⟨-⟩}				100		
9097.6(16)	⟨29 ⁻ ⟩					100	
9774.7(17)	⟨31 ⁻ ⟩						100

Energy levels and branching ratios [96Si12].

⁶⁴₃₀Zn

E^*	J^π	L	S_N	L	C^2S	S_α	S_α	L	σ (p,t)	N	σ (¹² C, ¹⁰ Be)	β_L	Γ_o	$T_{1/2}$ or	Ref.
[keV]			(d,n)		(τ ,d)	(⁶ Li,d)	rel.	(p,t)	μ b/sr	(p,t)	μ b/sr	(p,p')	[meV]	Γ_{cm}	
0.0	0 ⁺	1	0.55	1	1.68	0.34	1.0	0	835	453				Stable	66Ok02
991.55(5)	2 ⁺	1	1.2*	1	0.78		0.26	2	210	240	76	0.29		1.80(4) ps	90Bo27

(continued)

⁶⁴₃₀Zn

E^*	J^π	L	S_N	L	C^2S	S_α	L	σ (p,t)	N	σ (¹² C, ¹⁰ Be)	β_L	Γ_o	$T_{1/2}$ or	Ref.
[keV]			(d,n)		(τ ,d)	<i>rel.</i>	(p,t)	μ b/sr	(p,t)	μ b/sr	(p,p')	[meV]	Γ_{cm}	
0.0+X	$\langle 10^- \rangle$													
1799.35(5)	2 ⁺	1	0.39	1	0.16	0.01	2	20	21				2.0(2) ps	66Ok02
1910.31(6)	0 ⁺			1	0.10	<0.1	0	5.0	1.6				0.95(5) ns	74Hi05
512+X	$\langle 11^- \rangle$													
2306.71(8)	4 ⁺			3	0.45	0.03	4	3.0	11		0.06		0.33(7) ps	74Hi05
1075+X	$\langle 12^- \rangle$													
2609.4(2)	0 ⁺			1	0.32		0	16	4.7				0.20(8) ps	74Hi05
2736.53(8)	4 ⁺						4	63	210		0.02		1.5(3) ps	74Hi05
2793.8(3)	2 ⁺			$\langle 1 \rangle$	0.37	0.10	2	120	110				0.05(1) ps	77Fu03
2979.79(9)	3 ⁺					0.24					0.24		0.30(11) ps	68Jo16
2998.4(2)	3 ⁻			[4]	3.77		$\langle 3 \rangle$	39	230		incl		0.09(2) ps	67Fo10
3005.7(1)	2 ⁺			[1]	0.72								0.06(1) ps	67Fo10
3071.2(7)	$\langle 1,2^+ \rangle$									434				90Bo27
3077.8(1)	$\langle 4^+ \rangle$									incl			0.49(12) ps	90Bo27
3094.6(2)	3 ⁺ , 2 ⁺	1	2.4				4	44	150				0.09(1) ps	74Hi05
1677.2+X	$\langle 13^- \rangle$													
3186.8(1)	1 ⁺												0.04(1) ps	
3196.8(4)	$\langle 2,3 \rangle$													
3205.9(1)	$\langle 3 \rangle^+$												0.18(5) ps	
3240(20)	$\langle 0^+ \rangle$						0	11	3.7					74Hi05
3262.0(1)	1												0.4(2) ps	
3285														
3297.2(2)	$\langle 2 \rangle^+$												0.27(5) ps	
3306.8(2)	$\langle 4^+ \rangle$												0.26(8) ps	
3321.8(12)	$\langle 1 \rangle$													
3365.95(7)	1 ⁺						2	37	30			8.2(13)	0.023(8) ps	74Hi05
3369.8(1)	3 ⁺												0.4(1) ps	
3415														
3425.2(1)	1 ⁺											6.9(16)	0.03(1) ps	72Me14
3452.3(10)	$\langle 1,2^+ \rangle$													
3458.5(2)	$\langle 2,3 \rangle$												0.24(6) ps	
3465(5)	$\langle 4-6 \rangle^-$													
3500(10)	$\langle 2^+ \rangle$						$\langle 2 \rangle$	3.4	2.7					74Hi05
3538.7(10)	$\langle 2-6 \rangle$													
3547.0(2)	$\langle \leq 3 \rangle$													
3552.3(3)	4 ⁺												>1.0 ps	
3587(2)														
3597.2(2)	$\langle 2^+-4^+ \rangle$													
3602(1)	$\langle 1,2^+ \rangle$						$\langle 2 \rangle$	7.3	5.7					74Hi05
3606.5(5)	$\langle \leq 4 \rangle$													
3620.7(10)	$\langle 2-6 \rangle$													
3627	$\langle 0^+, 6^- \rangle$													
3628.4(5)	$\langle 3^+, 4^+ \rangle$												0.16(5) ps	
3681														
3698.8(7)														

(continued)

⁶⁴Zn
₃₀

E^*	J^π	L	S_N	L	C^2S	S_α	L	σ (p,t)	N	σ ($^{12}\text{C},^{10}\text{Be}$)	β_L	Γ_o	$T_{1/2}$ or	Ref.
[keV]			(d,n)		(τ ,d)	rel.	(p,t)	$\mu\text{b/sr}$	(p,t)	$\mu\text{b/sr}$	(p,p')	[meV]	Γ_{cm}	
3701.4(4)	1^-					0.26						18(3)	0.025(4) ps	72Me14
3710.4(6)	$\langle 2^+ \rangle$													
3718.4(3)													0.03(1) ps	
3760														
3780(10)	2^+						2	34	26					74Hi05
3795.25(18)	1^+													
3815.4(5)														
3819.6(2)														
2385.7+X	$\langle 14^- \rangle$													
3850.7(4)													<0.7 ps	
3853.3(2)	5^+												>2 ps	
3863.7(10)														
3880														
3898.5(4)	$\langle 2^+-4^+ \rangle$						$\langle 2 \rangle$	36					0.04(1) ps	74Hi05
3925.0(2)	5^-										0.08		<1.4 ps	68Jo16
3932.2(4)	$\langle 4,5 \rangle$													
3952.0(6)	$\langle 3^+,4^+ \rangle$													
3993.39(10)	6^+												0.12(3) ps	
4020.4(4)	$\langle 2^+,3^+ \rangle$						$\langle 0 \rangle$	5.5			0.04			74Hi05
4039.7(4)														
4077.44(16)	$\langle 5 \rangle^+$												0.5(2) ps	
4113(7)	2^+						$\langle 2 \rangle$	22	16					74Hi05
≈ 4140	$\langle 1^+,2^+ \rangle$										0.11			68Jo16
4154(10)														
4157.0(2)	$\langle 5^- \rangle$									530			0.11(3) ps	90Bo27
4159(1)	1											32(9)	7.7(25) fs	72Me14
4181.7(5)														
4205.2(4)	$\langle 3^+,4^+ \rangle$													
4219(10)	$\langle 3^+-5^+ \rangle$						$\langle 3,4 \rangle$	9.1						74Hi05
4236.76(12)	6^+												0.13(4) ps	
4288.5(4)	$\langle 4 \rangle^+$													
4305											0.07			68Jo16
4319(3)	$\langle 3^+,4^+ \rangle$													
4351(10)	$\langle 1^+-3^+ \rangle$													
4385(10)	3^-						$\langle 3 \rangle$	6.3	41					74Hi05
4420(10)	$\langle 3-5 \rangle^+$													
4454.2(5)	1^+											51(9)	3.2(6) fs	72Me14
4467(10)	$\langle 0^+ \rangle$													
4488(10)	$\langle 3^+-5^+ \rangle$						$\langle 0 \rangle$	7.4						74Hi05
4504(10)														
4522(10)														
4538(10)	3^+-5^+													
4556(3)														
3132.0+X	$\langle 15^- \rangle$													
4573(10)														

(continued)

⁶⁴₃₀Zn

E^*	J^π	L	S_N	L	C^2S	S_α	S_α	L	σ (p,t)	N	σ (¹² C, ¹⁰ Be)	β_L	Γ_o	$T_{1/2}$ or	Ref.
[keV]			(d,n)		(τ ,d)	(⁶ Li,d)	rel.	(p,t)	$\mu\text{b/sr}$	(p,t)	$\mu\text{b/sr}$		(p,p') [meV]	Γ_{cm}	
4608.4(9)	$\langle 1 \rangle$														
4615(10)	3^+-5^+														
4626(10)															
4634.92(10)	7^-										185			94(6) ps	90Bo27
4637(10)															
4664(2)	$\langle 1 \rangle$													41(12) fs	
4669.67(16)	$\langle 6 \rangle$														
4684															
4712.4(12)	$\langle 1 \rangle$														
4729(10)															
4751(10)	$\langle 3^+-5^+ \rangle$														
4761(10)															
4786(10)	$\langle 3^+-5^+ \rangle$														
4797(10)															
4816(10)	$\langle 1^+-3^+ \rangle$														
4824.3(6)	$\langle 5,6,7 \rangle$														
4851(10)	$\langle 3^+-5^+ \rangle$														
4902(10)	$\langle 3^+-5^+ \rangle$														
4935(10)	$\langle 2^--4^- \rangle$														
4947(10)	$\langle 2^+ \rangle$														
4981.2(2)	$\langle 7^- \rangle$													1.3(4) ps	
5005(10)	$\langle 1^+-3^+ \rangle$														
5038(10)															
5050(10)															
5067(2)															
5081(10)															
5111.9(4)															
5121(10)	$\langle 1^+-3^+ \rangle$														
5138(10)															
5152.0(2)	$\langle 7^- \rangle$														
5160(10)															
5171(10)															
5191(10)	$\langle 2^--4^- \rangle$														
5197(10)															
5211(10)															
5224(10)															
5232.2(10)															
5256(10)															
5267(10)															
5292(10)															
5307(10)											434				90Bo27
5319(10)															
5329(10)															
5337(10)															
5351(10)															

(continued)

⁶⁴**Zn**₃₀

E^*	J^π	L	S_N	L	C^2S	S_α	S_α	L	σ (p,t)	N	σ (¹² C, ¹⁰ Be)	β_L	Γ_o	$T_{1/2}$ or	Ref.
[keV]			(d,n)		(τ ,d)	(⁶ Li,d)	<i>rel.</i>	(p,t)	$\mu\text{b/sr}$	(p,t)	$\mu\text{b/sr}$	(p,p')	[meV]	Γ_{cm}	
5361(10)															
5375(10)															
5389.1(10)															
5398(10)															
5413(10)															
5425(10)															
3997.4+X	$\langle 16^- \rangle$														
5443(10)															
5457(10)															
5474(10)															
5485(10)															
5495(10)	$\langle 4^+ \rangle$														
5517(10)															
5530(10)															
5545(10)															
5553(10)															
5564(10)															
5576(10)															
5588(10)															
5601(10)															
5613(10)															
5624.5(3)	$\langle 8^- \rangle$														
5624.9(10)															
5642(10)															
5652(10)															
5665(10)															
5676(10)															
5681.5(3)	$\langle 9^- \rangle$										186			0.97(21) ps	90Bo27
5681.7(10)															
5699.8(2)	$\langle 7 \rangle$														
5719(10)															
5729(10)															
5737(10)															
5760(10)															
5770(10)															
5780(10)															
5792(10)															
5799.9(10)															
5812(10)															
5822(10)															
5833(10)															
5844(10)															
5860(10)															
5872(10)															
5882(10)															

(continued)

⁶⁴**Zn**₃₀

E^*	J^π	L	S_N	L	C^2S	S_α	S_α	L	σ (p,t)	N	σ (¹² C, ¹⁰ Be)	β_L	Γ_o	$T_{1/2}$ or	Ref.
[keV]			(d,n)		(τ ,d)	(⁶ Li,d)	rel.	(p,t)	μ b/sr	(p,t)	μ b/sr	(p,p')	[meV]	Γ_{cm}	
5890.7(10)															
5909(10)															
5920(10)															
5933(10)															
5935.9(7)	$\langle 8^+ \rangle$														
5948(10)															
6031.2(4)	$\langle 8^+ \rangle$														
6124.1(3)	$\langle 8^+ \rangle$														
6125.1(5)	$\langle 9^- \rangle$														
6262.1(6)	$\langle 7,8,9^- \rangle$														
6300(50)															
4911.7+X	$\langle 17^- \rangle$														
6390															
6700(50)											315				90Bo27
6766.1(8)	$\langle 9-11^- \rangle$														
6830															
6940.5(11)	$\langle 9-11^- \rangle$														
6962.6(4)	$\langle 8 \rangle$														
6995.1(4)	$\langle 11 \rangle$														
7000	$\langle 4^+ \rangle$														
7118.2(5)	$\langle 10^+ \rangle$														
7263.3(5)	$\langle 9-11^- \rangle$														
7334.8(4)	$\langle 10^+ \rangle$														
7380															
5994.2+X	$\langle 18^- \rangle$														
7446.2(12)															
7579.4(5)	$\langle 11^- \rangle$														
7805.8(10)	$\langle 10^+ \rangle$														
7900(50)											521				90Bo27
7902.1(11)	$\langle 9-11^- \rangle$														
7946(2)	$\langle 10^+ \rangle$														
8157(2)	$\langle 10^+ \rangle$														
8425.3(5)	$\langle 11 \rangle$														
7135.2+X	$\langle 19^- \rangle$														
8579.6(5)	$\langle 12^+ \rangle$														
8995.3(10)	$\langle 12^+ \rangle$														
9895.9(5)	$\langle 14 \rangle$														
8532.6+X	$\langle 20^- \rangle$														
10099.3(11)	$\langle 13 \rangle$														
10982.1(12)	$\langle 16 \rangle$														
9821.4+X	$\langle 21^- \rangle$														
11528.4(15)															
12238.2(15)															
12405.6(15)															
12679.1(15)															

$${}^{64}_{30}\text{Zn}$$

Additional data on this isotope can be found in [04Ka18, 90Bo27, 87Ja04, 82Be15, 68OkZZ].
Abundance: 48.63(60) %.
 * Values $S_N=(C^2S)/(2J_f+1)/(2J_i+1)$ for the (d,n) reaction are from [68Ok08]; for $E^*>3.1$ MeV they can be found in [96Si12].
 Presented absolute and relative values S_N from (${}^6\text{Li},d$) reaction [77Fu03, 78Be25] are commented in [96Si12] together with data from (${}^{16}\text{O},{}^{12}\text{C}$) reaction [71Fa12, 82Be15].
 Two-proton transfer reaction (${}^{12}\text{C},{}^{10}\text{Be}$) on ${}^{62}\text{Ni}$ was measured at 10° [90Bo27].
 Parameters of two-neutron pickup reaction: moments L [00Hu18], σ (p,t) and normalization factor $N=(2J+1)d\sigma/d\Omega_{exp}/9.72\sigma_{DWBA}$ are from [74Hi05]; energy resolution is about 20 keV, see [00Hu18].
 Cross section and $S_N=\sigma(exp)/\sigma(DWBA)$ for the ground state were determined in [75Al05] as 680(40) $\mu\text{b/sr}$ and 1.79 respectively.

$${}^{64}_{30}\text{Zn}$$

E^*	J^π	Branching ratios in percentage										
[keV]		E_f^* : J_f^π :	0.0 0 ⁺	991 2 ⁺	0.0+X <10 ⁻ >	1799 2 ⁺	1910 0 ⁺	512.0+X <11 ⁻ >	2307 4 ⁺	1075+X <12 ⁻ >	2609.43 0 ⁺	2736.53 4 ⁺
991.55(5)	2 ⁺		100									
1799.35(5)	2 ⁺		23(2)	77(2)								
1910.31(6)	0 ⁺		x	97		2.6(3)						
512+X	<11 ⁻ >				x							
2306.71(8)	4 ⁺			100								
1075+X	<12 ⁻ >				23(4)			77(4)				
2609.4(2)	0 ⁺	x	100			<0.5						
2736.53(8)	4 ⁺			4.7(6)		87(2)			9(1)			
2793.8(3)	2 ⁺	x	100									
2979.79(9)	3 ⁺			36(8)		64(3)						
2998.4(2)	3 ⁻		0.5(3)	95		≈5						
3005.7(1)	2 ⁺		27(2)	41(2)		32(2)						
3071.2(7)	<1,2 ⁺ >		28			72						
3077.8(1)	<4 ⁺ >			45(15)					50(5)			5
3094.6(2)	3 ⁺ ,2 ⁺			81		19						
1677.2+X	<13 ⁻ >							42(3)		58(3)		
3186.8(1)	1 ⁺		0.6(2)	35(3)		44(1)	21(1)					
3196.8(4)	<2,3>		11	58(3)		31(8)						

(continued)

⁶⁴₃₀Zn

E^* [keV]	J^π	Branching ratios in percentage										
		$E_f^*:$ $J_f^\pi:$	0.0 0 ⁺	991 2 ⁺	0.0+X ⟨10 ⁻ ⟩	1799 2 ⁺	1910 0 ⁺	512.0+X ⟨11 ⁻ ⟩	2307 4 ⁺	1075+X ⟨12 ⁻ ⟩	2609.43 0 ⁺	2736.53 4 ⁺
3205.9(1)	⟨3⟩ ⁺	x		2(1)		79(1)	8(4)		10(2)			
3262.0(1)	1	4.7(14)		84(4)		12(2)	<5					
3297.2(2)	⟨2⟩ ⁺	25(11)		58(8)		17(6)						
3306.8(2)	⟨4 ⁺ ⟩								100			
3321.8(12)	⟨1⟩	37(10)					63(18)					
3365.95(7)	1 ⁺	52(2)		28(1)		8.3(4)	7.4(4)				4.9(3)	
3369.8(1)	3 ⁺			30(3)		56(3)						14(3)
3425.2(1)	1 ⁺	69(3)		10(1)		18(1)	3.1(6)					
3452.3(10)	⟨1,2 ⁺ ⟩						100					
3458.5(2)	⟨2,3⟩	x		45(5)		55(4)						
3538.7(10)	⟨2-6⟩								100			
3547.0(2)	⟨≤3⟩					x						
3552.3(3)	4 ⁺	19(7)		37(3)					44(3)			
3597.2(2)	⟨2 ⁺ -4 ⁺ ⟩			34(4)					42(4)			24(6)
3602(1)	⟨1,2 ⁺ ⟩	100										
3606.5(5)	⟨≤4⟩			100								
3620.7(10)	⟨2-6⟩								100			
3628.4(5)	⟨3 ⁺ ,4 ⁺ ⟩			100								
3701.4(4)	1 ⁻	100										
3710.4(6)	⟨2 ⁺ ⟩	x							93		7	
3718.4(3)				100								
3795.25(18)	1 ⁺	34(2)		18(2)		45(3)					3.1(7)	
3815.4(5)						100						
3819.6(2)						100						
2385.7+X	⟨14 ⁻ ⟩									47(3)		
3850.7(4)				82(3)		18(2)						x
3853.3(2)	5 ⁺											100
3863.7(10)									x			
3898.5(4)	⟨2 ⁺ -4 ⁺ ⟩			83(11)					100			
3925.0(2)	5 ⁻											17(6)
3932.2(4)	⟨4,5⟩								76(4)			12(1)
3952.0(6)	⟨3 ⁺ ,4 ⁺ ⟩			100					100			
3993.39(10)	6 ⁺											
4020.4(4)	⟨2 ⁺ ,3 ⁺ ⟩			50(10)					100			50(10)
4039.7(4)				100								
4077.44(16)	⟨5⟩ ⁺								18(3)			62(6)
≈4140	⟨1 ⁺ ,2 ⁺ ⟩	x										
4157.0(2)	⟨5 ⁻ ⟩								53(5)			
4159(1)	1	54		46								
4181.7(5)						x			100			
4205.2(4)	⟨3 ⁺ ,4 ⁺ ⟩			100								
4236.76(12)	6 ⁺											100
4288.5(4)	⟨4⟩ ⁺											100
4319(3)	⟨3 ⁺ ,4 ⁺ ⟩			x								
4454.2(5)	1 ⁺	60(4)		3.5(7)		23(4)	14(3)					

(continued)

⁶⁴₃₀Zn

E^* [keV]	J^π	Branching ratios in percentage										
		E_f^* : J_f^π :	0.0 0 ⁺	991 2 ⁺	0.0+X ⟨10 ⁻ ⟩	1799 2 ⁺	1910 0 ⁺	512.0+X ⟨11 ⁻ ⟩	2307 4 ⁺	1075+X ⟨12 ⁻ ⟩	2609.43 0 ⁺	2736.53 4 ⁺
4556(3)				x								
4608.4(9)	⟨1⟩		≈22	78(26)								
4664(2)	⟨1⟩		x									
4712.4(12)	⟨1⟩		≈9			≈5					85(20)	
5067(2)									x			

Energy levels and branching ratios [96Si12]. Part 3

⁶⁴₃₀Zn

E^* [keV]	J^π	Branching ratios in percentage										
		E_f^* : J_f^π :	2793.8 2 ⁺	2998.38 3 ⁻	3005.69 2 ⁺	3077.77 ⟨4 ⁺ ⟩	1677+X ⟨13 ⁻ ⟩	3186.78 1 ⁺	3196.8 ⟨2,3⟩	3261.99 1	2386+X ⟨14 ⁻ ⟩	3925.0 5 ⁻
3306.8(2)	⟨4 ⁺ ⟩		<1									
3425.2(1)	1 ⁺				x							
3547.0(2)	⟨≤3⟩							66		34		
3587(2)									100			
3698.8(7)									100			
2385.7+X	⟨14 ⁻ ⟩						53(3)					
3925.0(2)	5 ⁻			11(1)								
3932.2(4)	⟨4,5⟩			x								
4077.44(16)	⟨5 ⁺ ⟩					20(2)						
4157.0(2)	⟨5 ⁻ ⟩			24(5)		23(6)						
3132.0+X	⟨15 ⁻ ⟩						50(3)				50(3)	
4669.67(16)	⟨6⟩											56(4)
4981.2(2)	⟨7 ⁻ ⟩											44(2)
5152.0(2)	⟨7 ⁻ ⟩											64(11)
3997.4+X	⟨16 ⁻ ⟩										45(4)	

Energy levels and branching ratios [96Si12]. Part 4

⁶⁴₃₀Zn

E^* [keV]	J^π	Branching ratios in percentage										
		E_f^* : J_f^π :	3993.39 6 ⁺	4077.44 ⟨5 ⁺ ⟩	4157.0 ⟨5 ⁻ ⟩	4236.76 6 ⁺	3132+X ⟨15 ⁻ ⟩	4634.92 7 ⁻	4669.67 ⟨6⟩	4981.2 ⟨7 ⁻ ⟩	5152.0 ⟨7 ⁻ ⟩	3997+X ⟨16 ⁻ ⟩
4634.92(10)	7 ⁻		83(2)			17(1)						
4669.67(16)	⟨6⟩			34(4)	11(2)							
4824.3(6)	⟨5,6,7⟩			x								
4981.2(2)	⟨7 ⁻ ⟩		9(1)		44(7)	3.1(4)						
5111.9(4)					100							
5152.0(2)	⟨7 ⁻ ⟩							36(6)				
5232.2(10)									x			

(continued)

⁶⁴₃₀Zn

E^*	J^π	Branching ratios in percentage										
[keV]		E_f^* : J_f^π :	3993.39 6 ⁺	4077.44 ⟨5⟩ ⁺	4157.0 ⟨5⟩ ⁻	4236.76 6 ⁺	3132+X ⟨15⟩ ⁻	4634.92 7 ⁻	4669.67 ⟨6⟩	4981.2 ⟨7⟩ ⁻	5152.0 ⟨7⟩ ⁻	3997+X ⟨16⟩ ⁻
5389.1(10)			100									
3997.4+X	⟨16⟩ ⁻						55(4)					
5624.5(3)	⟨8⟩ ⁻								x			
5624.9(10)								x				
5681.5(3)	⟨9⟩ ⁻							100				
5681.7(10)			100									
5699.8(2)	⟨7⟩							49(6)	48(5)		3(1)	
5799.9(10)								100				
5890.7(10)								100				
5935.9(7)	⟨8⟩ ⁺		75(5)			25(5)						
6031.2(4)	⟨8⟩ ⁺		43(3)			48(2)		10(2)				
6124.1(3)	⟨8⟩ ⁺		51(5)			26(2)		24(2)				
6125.1(5)	⟨9⟩ ⁻									100		
6262.1(6)	⟨7,8,9⟩ ⁻							100				
4911.7+X	⟨17⟩ ⁻						62(4)					38(4)
5994.2+X	⟨18⟩ ⁻											73(9)

Energy levels and branching ratios [96Si12]. Part 5

⁶⁴₃₀Zn

E^*	J^π	Branching ratios in percentage										
[keV]		E_f^* : J_f^π :	5624.5 ⟨8 ⁻ ⟩	5681.7	5699.8 ⟨7⟩	5935.9 ⟨8 ⁺ ⟩	6031.2 ⟨8 ⁺ ⟩	6124.1 ⟨8 ⁺ ⟩	6125.1 ⟨9 ⁻ ⟩	4912+X ⟨17 ⁻ ⟩	6995.1 ⟨11⟩	7118.2 ⟨10 ⁺ ⟩
6766.1(8)	⟨9-11 ⁻ ⟩			100								
6940.5(11)	⟨9-11 ⁻ ⟩	100										
6962.6(4)	⟨8⟩				26(5)			74(10)				
6995.1(4)	⟨11⟩			83(4)				17(1)				
7118.2(5)	⟨10 ⁺ ⟩					11(3)	27(1)		27(1)	36(2)		
7263.3(5)	⟨9-11 ⁻ ⟩			100								
7334.8(4)	⟨10 ⁺ ⟩							100				
5994.2+X	⟨18 ⁻ ⟩									27(9)		
7446.2(12)						100						
7579.4(5)	⟨11 ⁻ ⟩								100			
7805.8(10)	⟨10 ⁺ ⟩					100						
7902.1(11)	⟨9-11 ⁻ ⟩								x			
7946(2)	⟨10 ⁺ ⟩						100					
8157(2)	⟨10 ⁺ ⟩					100						
8425.3(5)	⟨11⟩										14.3(15)	86(3)
7135.2+X	⟨19 ⁻ ⟩									60(10)		
8579.6(5)	⟨12 ⁺ ⟩										46(2)	53(2)

Energy levels and branching ratios [96Si12]. Part 6

⁶⁴Zn
₃₀

E^* [keV]	J^π	Branching ratios in percentage										
		E_f^* : 5994+X J_f^π : $\langle 18^- \rangle$	7805.8 $\langle 10^+ \rangle$	8425.3 $\langle 11 \rangle$	7135+X $\langle 19^- \rangle$	8579.6 $\langle 12^+ \rangle$	9895.9 $\langle 14 \rangle$	8533+X $\langle 20^- \rangle$	10099.3 $\langle 13 \rangle$	10982.1 $\langle 16 \rangle$	11528.4	12405.6
7135.2+X	$\langle 19^- \rangle$	40(10)										
8579.6(5)	$\langle 12^+ \rangle$			1.4(2)								
8995.3(10)	$\langle 12^+ \rangle$		100									
9895.9(5)	$\langle 14 \rangle$					100						
8532.6+X	$\langle 20^- \rangle$	69(15)			31(15)							
10099.3(11)	$\langle 13 \rangle$			100								
10982.1(12)	$\langle 16 \rangle$						100					
9821.4+X	$\langle 21^- \rangle$				100							
11528.4(15)									100			
12238.2(15)										100		
12405.6(15)										100		
12679.1(15)										100		
11994.3+X	$\langle 22^- \rangle$							100				
13538.4(16)											100	
13830.2(18)												100
13840.6(18)												100

Energy levels and branching ratios [93Bh04].

⁶⁵Zn
₃₀

E^* [keV]	$2J^\pi$	L	S' (d,p)	σ (d,p) $\mu\text{b/sr}$	σ (d,p) $\mu\text{b/sr}$	L	C^2S (p,d)	σ (p,d) $\mu\text{b/sr}$	L	C^2S (τ, α)	E_{anal}^* [keV]	$T_{1/2}$ or Γ_{cm}	Ref.
0.0	5^-	3	2.03	910	670	3	1.79	630	3	4.00		244.06(10) d	67Vo05
53.928(10)	$\langle 1 \rangle^-$	1	0.46	2200	4160	1	0.16	730	1	0.31		1.6 μs	67Vo05
115.13(1)	3^-	1	0.90	4300	4160	1	0.96	5000	1	2.0		444(9) ps	67Vo05
206.94(8)	3^-	1	0.05	250	370	1	0.09	320	1	0.20		150(7) ps	67Vo05
768.70(8)	5^-								3	0.14		1.3(+7-4) ps	71Be42
864.21(7)	7^-											3(+5-2) ps	
866.92(12)	1^-	1	0.45	2400	3820	1	0.26	640	1	0.60		0.55(+27-15) ps	67Vo05
909.6(1)	3^-	1	0.12	630					1	0.12		1.4(+5-3) ps	67Vo05
1047.4(1)	5^-											0.37(9) ps	
1062.1(7)													
1065.5(9,1)	9^+	4	5.10	1000	1610			90	4	0.65		575(26) ps	67Vo05
1252.7(1)	7^-							70	3	0.22		1.1(5) ps	66Mc15
1263.4(2)	9^-							incl					
1343.8(1)	5^-											≈ 1.7 ps	
1369.08(18)	5^+	2	0.98	3400	4160			60	2	0.15		≈ 1.4 ps	67Vo05
1469.7(1)	3^-	1	0.05	250								0.16(4) ps	67Vo05
1577.1(3)	3^-							90				0.17(4) ps	66Mc15
1588.1(3)	7^-							incl	3	0.31		0.15(6) ps	71Be42
1603													
1779.6(7)													

(continued)

⁶⁵Zn

E^*	$2J^\pi$	L	S'	σ (d,p)	σ (d,p)	L	C^2S	σ (p,d)	L	C^2S	E^*_{anal}	$T_{1/2}$ or	Ref.
[keV]			(d,p)	$\mu\text{b/sr}$	$\mu\text{b/sr}$		(p,d)	$\mu\text{b/sr}$		(τ, α)	[keV]	Γ_{cm}	
1793.5(7)													
1907.5(4)	$\langle 9 \rangle$												
1908(5)	1^+	0	0.08	4100	4190								67Vo05
1941.1(6)	$\langle 1,3,5^+ \rangle$												
1956(5)	$\langle 5^-, 7^- \rangle$							90	3	0.17			66Mc15
1957.3(8)	7^+											0.42(7) ps	
1976(5)													
2052.2(12)				≈ 200									
2053.8(3)	13^+											>1.4 ps	
2081.5(2)	$\langle 1,3,5^+ \rangle$												
2135.2(8)	9^+											>1.4 ps	
2137(5)													
2137.7(4)	11^+											0.67(12) ps	
2202(5)	$\langle 1,3,5^+ \rangle$												
2216(5)	$\langle 1,3,5^+ \rangle$												
2248(5)	$\langle 5^-, 7^- \rangle$							90	3	0.18			66Mc15
2302.1(4)													
2310(5)													
2342(5)													
2410(5)													
2419.2(2)	1^-	1	0.08	550	1010								67Vo05
2430(5)	$\langle 1,3,5^+ \rangle$									0.19			71Be42
2458(5)	$\langle 1,3,5^+ \rangle$												
2486(5)													
2491(5)	1^+	0	0.004	180									67Vo05
2522(5)													
2528(5)	$3^+, 5^+$	2	0.11	440	1060								67Vo05
2549.4(4)	$5^-, 7^-$								3	0.23			71Be42
2575(10)	$\langle 1,3,5^+ \rangle$			140									
2639													
2674(10)	$3^+, 5^+$	2	0.07	300						0.25			67Vo05
2730(5)	$\langle 1,3,5^+ \rangle$												
2740(5)													
2803(5)	$\langle 1^-, 3^- \rangle$	$\langle 1 \rangle$		≈ 200									67Vo05
2830(5)	$\langle 7^+, 9^+ \rangle$								$\langle 4 \rangle$	0.14			71Be42
2860(5)													
2870(5)	$5^-, 7^-$							70	3	0.28			66Mc15
2902(5)													
2914(5)	$5^-, 7^-$							incl	3	0.14			71Be42
2923.1(4)	13												
2931.8(9)	$\langle 9, 13 \rangle$												
2953(5)													
2971(5)													
2994(5)	$\langle 1,3,5^+ \rangle$												
3010(5)	$3^+, 5^+$	2	0.07	300	1060								67Vo05

(continued)

⁶⁵₃₀Zn

E^*	$2J^\pi$	L	S'	σ (d,p)	σ (d,p)	L	C^2S	σ (p,d)	L	C^2S	E^*_{anal}	$T_{1/2}$ or	Ref.
[keV]			(d,p)	$\mu\text{b/sr}$	$\mu\text{b/sr}$		(p,d)	$\mu\text{b/sr}$		(τ, α)	[keV]	Γ_{cm}	
3023(5)	$\langle 7^+, 9^+ \rangle$								$\langle 4 \rangle$	0.18			71Be42
3053(5)	1^+	0	0.04	1900									67Vo05
3095(5)													
3108(5)	$3^+, 5^+$	2	0.10	500									67Vo05
3150(5)	$1^-, 3^-$								1	0.58			71Be42
3170(20)	$5^-, 7^-$								3	0.10			71Be42
3192	$\langle 1, 3, 5^+ \rangle$												
3211(5)				≈ 200									
3221(5)													
3227.3(5)	17^+											0.30(+12-10) ps	
3239(5)	$\langle 7^+, 9^+ \rangle$								$\langle 4 \rangle$	0.28			71Be42
3329	$\langle 1, 3, 5^+ \rangle$												
3335.8(6)													
3340(5)													
3350(5)	$3^+, 5^+$	2	0.07	360									67Vo05
3409(10)	$\langle 1, 3, 5^+ \rangle$			≈ 200	1840								
3465(5)	$\langle 1, 3, 5^+ \rangle$	2	0.21		incl								63Li06
3472.6(4)	$\langle 15 \rangle$												
3550(5)	$3^+, 5^+$	2	0.24	1200	3520								67Vo05
3563(5)	$5^-, 7^-$								3	0.17			71Be42
3589	$\langle 1, 3, 5^+ \rangle$												
3618(10)	$3^+, 5^+$	2	0.24	1400	incl								67Vo05
3672(10)	1^+	0	0.09	4400	1660								67Vo05
3712													
3730(5)	$\langle 1, 3, 5^+ \rangle$												
3776(5)													
3784.9(6)	$17^+, 13^+$											≥ 0.28 ps	
3810(5)	$\langle 1, 3, 5^+ \rangle$			300									
3844(5)	1^+	0	0.03	1200									67Vo05
3880(5)													
3889(5)													
3902(5)	$\langle 7^+, 9^+ \rangle$								$\langle 4 \rangle$	0.22			71Be42
4024	$\langle 1, 3, 5^+ \rangle$												
4039	$\langle 1, 3, 5^+ \rangle$												
4079.2(5)	$\langle 13, 15 \rangle$												
4086(5)	$3^+, 5^+$								2	0.19			
4200(5)	$3^+, 5^+$	2											67Vo05
4270(20)													
4350(5)	1^+	0	0.35										67Vo05
4393	1^+												
4490(20)	$5^-, 7^-$								3	0.20			
4500(30)	$\langle 1^+ \rangle$	$\langle 0 \rangle$			10500								63Li06
4580(20)	$\langle 5^-, 7^- \rangle$								$\langle 3 \rangle$	0.20			71Be42
4620	$\langle 1, 3, 5^+ \rangle$												
4624.7(7)													

(continued)

⁶⁵₃₀Zn

E^*	$2J^\pi$	L	S'	σ (d,p)	σ (d,p)	L	C^2S	σ (p,d)	L	C^2S	E_{anal}^*	$T_{1/2}$ or	Ref.
[keV]			(d,p)	$\mu\text{b/sr}$	$\mu\text{b/sr}$		(p,d)	$\mu\text{b/sr}$		(τ, α)	[keV]	Γ_{cm}	
4639	$\langle 1,3,5^+ \rangle$												
4660(20)	$5^-, 7^-$								3	0.16			
4740(5)	1^+	0	0.54		15000								63Li06
4780(5)	$5^-, 7^-$								3	0.19			71Be42
4888(1)													
4920(20)	$\langle 7^+, 9^+ \rangle$								$\langle 4 \rangle$	0.13			71Be42
4938(1)	21												
4970(5)													
4980(5)													
4990(5)	$\langle 1^-, 3^- \rangle$								$\langle 1 \rangle$	0.11			71Be42
5066.9(8)	$\langle 19 \rangle$												
5100(5)													
5120(5)													
5360(20)	$\langle 5^-, 7^- \rangle$								$\langle 3 \rangle$	0.17			71Be42
5413.6(9)	$\langle 21 \rangle$												
5547	$\langle 1,3,5^+ \rangle$												
5773(1)													
5810(20)	$5^-, 7^-$								3	0.12			71Be42
6847													
7450(20)*	$1^-, 3^-$								$\langle 1 \rangle$		0.0		71Be42
8003													
8210(20)	$\langle 1^-, 3^- \rangle$										770		
8560(20)											1114		
8920(20)											1482		
9060(20)											1623		
9120(20)											1725		
9520(20)											2093		
10030(50)													
0+X	$2J \geq \langle 25 \rangle$												
1341+X	$2J+4$												
2832+X	$2J+8$												
4500+X	$2J+12$												
6387+X	$2J+16$												
8508+X	$2J+20$												
10870+X	$2J+24$												
13533+X	$2J+28$												
16538+X	$2J+32$												
19887+X	$2J+36$												
0+Y	$2J_2$												
744+Y	$2J_2+2$												
1621+Y	$2J_2+4$												
2478+Y	$2J_2+6$												
3396+Y	$2J_2+8$												
4338+Y	$2J_2+10$												
5357+Y	$2J_2+12$												

(continued)

⁶⁵₃₀Zn

E^*	$2J^\pi$	L	S'	σ (d,p)	σ (d,p)	L	C^2S	σ (p,d)	L	C^2S	E_{anal}^*	$T_{1/2}$ or	Ref.
[keV]			(d,p)	$\mu\text{b/sr}$	$\mu\text{b/sr}$		(p,d)	$\mu\text{b/sr}$		(τ, α)	[keV]	Γ_{cm}	
6402+Y	$2J_2+14$												
7610+Y	$2J_2+16$												
8841+Y	$2J_2+18$												
10307+Y	$2J_2+20$												
11658+Y	$2J_2+22$												
13295+Y	$2J_2+24$												
0+Z	$2J_4$												
688+Z	$2J_4+2$												
1454+Z	$2J_4+4$												
2304+Z	$2J_4+6$												
3250+Z	$2J_4+8$												
4238+Z	$2J_4+10$												
5353+Z	$2J_4+12$												
6553+Z	$2J_4+14$												
7906+Z	$2J_4+16$												
9379+Z	$2J_4+18$												
11029+Z	$2J_4+20$												
			67Vo05		63Li06		66Mc15	66Mc15		71Be42	86Wa02		Ref.
			63Li06	67Vo05			76VaYX						Ref.

Additional data on this isotope can be found in [01Mu33, 01Mu24, 00Yu02, 94En02].

* Isobar - Analog State (IAS) of ⁶⁵Cu ground state [71Be42]; corresponding excitations E_o for other IAS are presented in the separate column [86Wa02, 71Be42]

Presented values S' from (d,p) reaction [67Vo05, 63Li06] were renormalized in [86Wa02], cross sections are from original works; limited energy resolution at the higher energies were noticed.

Data for (p,d) reaction [66Mc15, 76VaYX] were renormalized and averaged in [86Wa02].

Energy levels and branching ratios [93Bh04]. Part 2

⁶⁵₃₀Zn

E^*	$2J^\pi$	Branching ratios in percentage										
		E_f^* :	0.0	53.9	115.1	207	769	864	867	909.6	1047.4	1065.5
[keV]		$2J_f^\pi$:	5 ⁻	$\langle 1 \rangle^-$	3 ⁻	3 ⁻	5 ⁻	7 ⁻	1 ⁻	3 ⁻	5 ⁻	9 ⁺
53.928(10)	$\langle 1 \rangle^-$		100									
115.13(1)	3 ⁻		83(12)	17(2)								
206.94(8)	3 ⁻		22(2)	78(8)	≤ 3.5							
768.70(8)	5 ⁻		58(5)	7.4(8)	34(3)	0.4(1)						
864.21(7)	7 ⁻		84(1)		15(1)	0.6(1)						
866.92(12)	1 ⁻		1.5(2)	1.3(1)	96(6)	1.5(2)						
909.6(1)	3 ⁻		49(5)	17(1)	25(2)	7.6(8)	1.8(3)					
1047.4(1)	5 ⁻		34(3)	1.9(4)	64(3)	< 2.0	0.50(11)					
1062.1(7)						x		x				
1065.5(9,1)	9 ⁺		9.0(9)						91(1)			
1252.7(1)	7 ⁻		10(1)		21(2)	54(2)	15(2)					

(continued)

⁶⁵₃₀Zn

E^* [keV]	$2J^\pi$	Branching ratios in percentage										
		$E_f^*:$ $2J_f^\pi:$	0.0 5 ⁻	53.9 ⟨1⟩ ⁻	115.1 3 ⁻	207 3 ⁻	769 5 ⁻	864 7 ⁻	867 1 ⁻	909.6 3 ⁻	1047.4 5 ⁻	1065.5 9 ⁺
1263.4(2)	9 ⁻		96(1)					4.3(6)				
1343.8(1)	5 ⁻		18(2)	1.1(3)	63(4)	13(1)	3(3)	2.4(4)				
1369.08(18)	5 ⁺		37(3)		63(3)							
1469.7(1)	3 ⁻		4.9(5)	17(2)	58(6)	5.6(6)	x		4.9(1)	6.0(8)	4.1(10)	
1577.1(3)	3 ⁻		61(2)	39(2)	x	x	x					
1588.1(3)	7 ⁻		68(2)		22(2)		10(1)					
1779.6(7)		x	x									
1793.5(7)		x	x									
1907.5(4)	⟨9⟩	x					x					
1941.1(6)	⟨1,3,5 ⁺ ⟩	x	x		x							
1957.3(8)	7 ⁺											79(1)
2053.8(3)	13 ⁺											100
2081.5(2)	⟨1,3,5 ⁺ ⟩				47(6)	53(6)						
2135.2(8)	9 ⁺							x				x
2137.7(4)	11 ⁺											100
2202(5)	⟨1,3,5 ⁺ ⟩				44					56		
2302.1(4)							100					
2419.2(2)	1 ⁻		2(1)	21(3)	5(3)	72(6)						
2458(5)	⟨1,3,5 ⁺ ⟩								100			
2549.4(4)	5 ⁻ , 7 ⁻		55(9)		11(5)			34(9)				
2923.1(4)	13											36(8)
3150(5)	1 ⁻ , 3 ⁻		100									
3409(10)	⟨1,3,5 ⁺ ⟩					100						

Energy levels and branching ratios [93Bh04]. Part 3

⁶⁵₃₀Zn

E^* [keV]	$2J^\pi$	Branching ratios in percentage										
		$E_f^*:$ $2J_f^\pi:$	1263.4 9 ⁻	1369.1 5 ⁺	2052.2	2053.8 13 ⁺	2137	2137.7 11 ⁺	2923.1 13	3227.3 17 ⁺	3472.6 ⟨15⟩	3784.9 17 ⁺ , 13 ⁺
1957.3(8)	7 ⁺			21.0(10)								
2135.2(8)	9 ⁺			x								
2923.1(4)	13				x			64(8)				
2931.8(9)	⟨9,13⟩	100										
3227.3(5)	17 ⁺				100							
3335.8(6)					x	x						
3472.6(4)	⟨15⟩				32(6)			68(6)				
3712							100					
3784.9(6)	17 ⁺ , 13 ⁺				66(8)					34(8)		
4079.2(5)	⟨13,15⟩								44(6)		≈56	
4624.7(7)										100		
4888(1)										100		

(continued)

⁶⁵₃₀Zn

E^*	$2J^\pi$	Branching ratios in percentage										
[keV]		E_f^* :	1263.4	1369.1	2052.2	2053.8	2137	2137.7	2923.1	3227.3	3472.6	3784.9
		$2J_f^\pi$:	9^-	5^+		13^+		11^+	13	17^+	$\langle 15 \rangle$	$17^+, 13^+$
4938(1)	21									100		
5066.9(8)	$\langle 19 \rangle$											100

Energy levels and branching ratios [93Bh04]. Part 4

⁶⁵₃₀Zn

E^*	$2J^\pi$	Branching ratios in percentage										
[keV]		E_f^* :	4937.9	5066.9	5413.6	5772.9	6847	0+X	1341+X	2832+X	4500+X	6387+X
		$2J_f^\pi$:	21	$\langle 19 \rangle$	$\langle 21 \rangle$				$2J+4$	$2J+8$	$2J+12$	$2J+16$
5413.6(9)	$\langle 21 \rangle$			100								
5773(1)			x	x								
6847					x	x						
8003							100					
1341+X	$2J+4$							100				
2832+X	$2J+8$								100			
4500+X	$2J+12$									100		
6387+X	$2J+16$										100	
8508+X	$2J+20$											100

Energy levels and branching ratios [93Bh04]. Part 5

⁶⁵₃₀Zn

E^*	$2J^\pi$	Branching ratios in percentage										
[keV]		E_{f}^* : $2J_{\text{f}}^\pi$:	8508+X $2J+20$	10870+X $2J+24$	13533+X $2J+28$	16538+X $2J+32$	0+Y $2J_2$	744+Y $2J_2+2$	1621+Y $2J_2+4$	2478+Y $2J_2+6$	3396+Y $2J_2+8$	4338+Y $2J_2+10$
10870+X	$2J+24$		100									
13533+X	$2J+28$			100								
16538+X	$2J+32$				100							
19887+X	$2J+36$					100						
1621+Y	$2J_2+4$						x					
2478+Y	$2J_2+6$							100				
3396+Y	$2J_2+8$								x	x		
4338+Y	$2J_2+10$									x	x	
5357+Y	$2J_2+12$										x	x
6402+Y	$2J_2+14$											x

Energy levels and branching ratios [93Bh04]. Part 6

⁶⁵₃₀Zn

E^* [keV]	$2J^\pi$	Branching ratios in percentage									
		E_f^* : $2J_f^\pi$:	5357+Y $2J_2+12$	6402+Y $2J_2+14$	7610+Y $2J_2+16$	8841+Y $2J_2+18$	10307+Y $2J_2+20$	0+Z $2J_4$	688+Z $2J_4+2$	1454+Z $2J_4+4$	2304+Z $2J_4+6$
6402+Y	$2J_2+14$		x								
7610+Y	$2J_2+16$		x	x							
8841+Y	$2J_2+18$			x	x						
10307+Y	$2J_2+20$				100						
11658+Y	$2J_2+22$					100					
13295+Y	$2J_2+24$						100				
688+Z	$2J_4+2$							x			
1454+Z	$2J_4+4$							x	x		
2304+Z	$2J_4+6$								x	x	
3250+Z	$2J_4+8$									x	x
4238+Z	$2J_4+10$										x

Energy levels and branching ratios [93Bh04]. Part 7

⁶⁵₃₀Zn

E^* [keV]	$2J^\pi$	Branching ratios in percentage					
		E_f^* : $2J_f^\pi$:	3250+Z $2J_4+8$	4238+Z $2J_4+10$	5353+Z $2J_4+12$	6553+Z $2J_4+14$	7906+Z $2J_4+16$
4238+Z	$2J_4+10$		x				
5353+Z	$2J_4+12$		x	x			
6553+Z	$2J_4+14$			x	x		
7906+Z	$2J_4+16$				x	x	
9379+Z	$2J_4+18$					x	
11029+Z	$2J_4+20$						x

Energy levels and branching ratios [98Bh02].

⁶⁶₃₀Zn

E^*	J^π	L	σ (t,p)	L	C^2S	L	S_N	C^2S	L	C^2S	C^2S	σ (p,d)	σ (p, α)	N	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$		(d,n)		(τ ,d)	(τ ,d)		(d,t)	(p,d)	$\mu\text{b/sr}$	rel.	(α , ² He)	
0.0	0 ⁺	0	4290(860)	1	0.2*	1	0.54	2.18	3	0.27	0.44	280	0.3	11000(4000)	72Hu06
1039.237(3)	2 ⁺	2	98(20)	1	0.35	1	1.25	1.00	1	0.10	0.10	810	1.3		72Hu06
1872.781(3)	2 ⁺	2	43(9)	1	0.20	1	0.36	0.29	1	0.011	0.01	60	1.2		72Hu06
2372.373(4)	0 ⁺	0	49(10)			1	0.1	0.40					0.2		67Fo10
2451.01(5)	4 ⁺	$\langle 4 \rangle$	6(1)			3	0.92	0.41	$\langle 1 \rangle$	0.02	0.02	70	1.8		72Hu06
2703.6(4)	$\langle 3 \rangle$								$\langle 0 \rangle$	0.06			1.1		75Bo01
2762.8(6)	$\langle 2 \rangle$														
2765.56(7)	4 ⁺												0.8		67Ka11
2780.18(1)	2 ⁺	2	111(22)			[1]	0.38	0.30	1	0.55	0.52	1850	0.9		72Hu06
2826.73(5)	3 ⁻	3	103(21)			[4]	2.98	1.70					0.9		72Hu06

(continued)

⁶⁶₃₀Zn

E^*	J^π	L	σ (t,p)	L	C^2S	L	S_N	C^2S	L	C^2S	C^2S	σ (p,d)	σ (p, α)	Γ_o	N	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$		(d,n)		(τ ,d)	(τ ,d)		(d,t)	(p,d)	$\mu\text{b/sr}$	<i>rel.</i>	[meV]	(α , ² He)	
2938.10(1)	2 ⁺	2	61(12)	1	0.59	(1)	0.8	0.64	3	0.22	0.47	110	0.7			68Ok08
3030	$\langle 0^+ \rangle$															
3077.73(23)	4 ⁺	4	20(4)			(3)	2.1	0.92	1	0.06	0.10	310	0.9			67Fo10
3105.06(1)	0 ⁺	0	42(8)										0.1			72Hu06
3212.61(1)	2 ⁺	2	14(3)										0.7			72Hu06
3226.2(11)													0.4			67Ka11
3228.91(1)	1 ⁺								1	0.12	0.15	450	0.3			75Bo01
3241.2(11)																
3331.47(1)	2 ⁺	2	56(11)	1	1.19				1	0.10	0.14	390	0.7			72Hu06
3380.97(1)	1 \langle^-												0.4	16(3)		67Ka11
3427.43(2)	1,2 ⁻															
3432.44(1)	1 \langle^-												0.7	8(3)		67Ka11
3507.28(2)	2 ⁺								1	0.39	0.30	870	0.9			75Bo01
3523.6(8)													0.7			67Ka11
3531.73(1)	0 ⁺	0	41(8)										0.3			72Hu06
3576.40(2)	4 ⁺	2	15(3)										0.8			72Hu06
3670.73(5)	2 ⁺												1.3			67Ka11
3689.01(16)	1 ⁺ -3 ⁺			1	1.53				1	0.28	0.30	680	0.8			68Ok08
3709.4(3)	$\langle 5 \rangle$												0.5			67Ka11
3725.3(5)													0.5			67Ka11
3731.6(5)		[2]	86(17)													72Hu06
3738.24(2)	1		incl											24(3)		72Hu06
3738.24(4)	$\langle 4^+ \rangle$	[4]	49(10)													72Hu06
3747.03(19)	5 ⁻															90Bo27
3753.05(4)	4 ⁺															
3770(30)	$\langle 1^- \rangle$															
3791.15(1)	1 ⁺								1	0.56	0.80	1900	0.4			75Bo01
3806.4(10)													0.7			67Ka11
3824.9(3)	0												0.4			67Ka11
3874(5)																
3882.46(1)	$\langle 2 \rangle$															
3898.3(6)	5 ⁻	5	32(6)										0.4			72Hu06
3924.71(20)													0.7			67Ka11
3946(2)	$\langle 1^- \rangle$												1.3			67Ka11
3969(2)	$\langle 4^+ \rangle$	$\langle 4 \rangle$	7(2)										0.8			67Ka11
4005(10)	4 ⁺										0.10	250				66Mc15
4011.7																
4019.2(15)	2 ⁺	2	25(5)	1	0.49								0.7			72Hu06
4075.7(3)	$\langle 6^- \rangle$															
4081.0(15)													0.2			67Ka11
4086.01(1)	1										0.40	770	0.6			67Ka11
4108.5(10)																
4119.0(5)	$\langle 1^- \rangle$	$\langle 1 \rangle$	28(6)										1.9			72Hu06
4182.7(5)	$\langle 6^+ \rangle$															
4186(7)	$\langle 3^- \rangle$	$\langle 3 \rangle$	8(2)													72Hu06

(continued)

⁶⁶₃₀Zn

E^*	J^π	L	σ (t,p)	L	C^2S	L	S_N	C^2S	L	C^2S	C^2S	σ (p,d)	σ (p, α)	Γ_o	N	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$		(d,n)		(τ ,d)	(τ ,d)		(d,t)	(p,d)	$\mu\text{b/sr}$	<i>rel.</i>	[meV]	(α , ² He)	
4223(2)	$\langle 1^- \rangle$												0.4			
4251.9(3)	$\langle 7^- \rangle$	$\langle 7 \rangle$	19(4)												60(10)	90Fi07
4258(2)																
4267(7)	4^+															
4295.37(1)	1^+												0.2	67(20)		67Ka11
4321.83(20)																
4332(7)	2^+	2	18(4)													72Hu06
4393.7(16)	3^-	3	49(10)										1.8			72Hu06
4424(6)	1													65(10)		72Me14
4433(6)	1^-	1	104(21)													72Hu06
4439(7)	2^+															
4454(5)																
4461.41(1)	1^+													28(21)		72Me14
4472(7)	3^-															
4497.6(5)																
4511(5)	0^+	0	140(28)													72Hu06
4511(5)	$\langle 2^+ \rangle$	$\langle 2 \rangle$	37(7)													72Hu06
4527(5)																
4538(7)	4^+															
4565(2)	3^-															
4567(10)	5^-	5	19(4)													72Hu06
4609(2)	$\langle 1 \rangle$															
4610(5)	4^+															
4622(6)																
4635.3(11)	$\langle 2 \rangle$															
4638.28(14)	1															
4645(10)																
4655(7)	$\langle 3^-, 4^+ \rangle$															
4675.6(5)	1															
4680(50)																
4683(10)	$\langle 1 \rangle$															
4694(7)	4^+															
4730(7)	2^+			$\langle 1 \rangle$	0.10											68Ok08
4745(10)																
4758(10)																
4780(7)	5^-														55(20)	90Fi07
4796(7)	$\langle 1^- \rangle$															
4806.25(1)	1^+															
4814.1(4)	$\langle 7^- \rangle$															90Bo27
4832(10)																
4849.97(3)	1															
4866.10(2)	1															
4875(10)																
4885(10)																
4907(10)																

(continued)

⁶⁶₃₀Zn

E^*	J^π	L	σ (t,p)	L	C^2S	L	S_N	C^2S	L	C^2S	C^2S	σ (p,d)	σ (p, α)	Γ_o	N	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$		(d,n)		(τ ,d)	(τ ,d)		(d,t)	(p,d)	$\mu\text{b/sr}$	<i>rel.</i>	[meV]	(α , ² He)	
4918(10)																
4945(10)																
4958.3(4)	1															
4984(10)																
5005.8(4)	1															
5025(10)																
5038(10)																
5059(10)																
5073(10)																
5086(10)																
5097(10)																
5106(10)																
5111.9(4)	$\langle 8^- \rangle$															
5124(10)																
5143(10)																
5159(10)																
5169(10)																
5180(10)																
5198(10)																
5207.3(5)	$\langle 8^+ \rangle$														130(40)	90Bo27
5222(10)																
5234(10)																
5245(10)																
5263(10)																
5274(10)																
5285(10)																
5305(10)																
5322(10)																
5331(10)																
5352(10)																
5364(10)																
5375(10)																
5389(10)																
5403(10)																
5420(10)																
5431(10)																
5446(10)																
5464.4(5)	$\langle 9^- \rangle$															
5500(45)																
5650(30)	3^-															
5740(50)																
6000(50)																
6292.6(6)	$\langle 10^+ \rangle$															
6419.0(8)																
6850(50)	$\langle 8^+ \rangle$															90Bo27

(continued)

⁶⁶₃₀Zn

E^*	J^π	L	σ (t,p)	L	C^2S	L	S_N	C^2S	L	C^2S	C^2S	σ (p,d)	σ (p, α)	Γ_o	N	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$		(d,n)		(τ ,d)	(τ ,d)		(d,t)	(p,d)	$\mu\text{b/sr}$	<i>rel.</i>	[meV]	(α , ² He)	
7170(180)																
7367.4(4)	1															
7517.3(10)																
7550(50)	$\langle 6^+ \rangle$															
7693.3(3)	1															
11059.9(10)	$2^-, 3^-$															
11395(10)																
11411(10)																
11457(10)																
11514(10)																
11593(10)																
11654(10)																
11698(10)																
11757(10)																
11841(10)	$\langle 2^+ \rangle$															
11916(10)																
12194(10)																
12218(10)																
12293(10)																
12324(10)																
12401(10)																
12433(10)																
12552(10)																
12602(10)																
12651(10)																
12688(10)																
12714(10)																

(continued)

⁶⁶₃₀Zn

E^*	J^π	L	σ (t,p)	L	C^2S	L	S_N	C^2S	L	C^2S	C^2S	σ (p,d)	σ (p, α)	Γ_o	N	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$		(d,n)		(τ ,d)	(τ ,d)		(d,t)	(p,d)	$\mu\text{b/sr}$	<i>rel.</i>	[meV]	(α , ² He)	
			72Hu06						75Bo01			66Mc15		72Me14	90Fi07	Ref.
								67Fo10			66Mc15		67Ka11			Ref.

Additional data on this isotope can be found in [02Vi08, 02Ga20, 94En02, 93Al15, 90Bo27, 87Ja04, 83Sa15, 68OkZZ, 63Li06].

Abundance: 27.90(27) %.

* All values are recalculated by [83Wa30] using the (d,n) normalization factor of 1.53 [77En02, 98Bh02].

Parameters S_N for the (τ ,d) reaction were derived in [98Bh02] from the data on C^2S from [67Fo10] given in the next column; assumption was used that transferred angular momentum is $j=3/2, 5/2$ and $9/2$ for $L=1, 2-3$ and 4 , respectively.

Parameter $N=(d\sigma/d\Omega \text{ (exp)})/(d\sigma/d\Omega \text{ (DWBA)})$ has a meaning of S_N in the case of two-neutron transfer reaction (α ,²He) [90Fi07].

Cross section 590(30) $\mu\text{b/sr}$ with $L=0$ for (τ ,n) reaction to the ground state was obtained in [75Al05].

σ (p, α) from [67Ka11] is the intensity relative to the average intensity of six levels from 1.87 MeV to 2.78 MeV; data on analogous intensity of (p,p') reaction can be found in [67Ka11].

Two-proton transfer reaction (¹²C,¹⁰Be) on ⁶⁶Ni was measured at 10° [90Bo27].

Cross section and $S_N=\sigma(\text{exp})/\sigma(\text{DWBA})$ for the ground state were determined in [75Al05] as 590(30) $\mu\text{b/sr}$ and 2.11, respectively.

Energy levels and branching ratios [98Bh02]. Part 2

⁶⁶₃₀Zn

E^*	J^π	σ (¹² C, ¹⁰ Be)	$T_{1/2}$ or	Ref.	Branching ratios in percentage							
[keV]		$\mu\text{b/sr}$	Γ_{cm}		E_f^* : 0.0	1039	1873	2372	2451	2763	2766	2780
					J_f^π : 0 ⁺	2 ⁺	2 ⁺	0 ⁺	4 ⁺	$\langle 2 \rangle$	4 ⁺	2 ⁺
0.0	0 ⁺		Stable	72Hu06								
1039.237(3)	2 ⁺	73	1.65(6) ps	72Hu06	100							
1872.781(3)	2 ⁺		0.19(7) ps	72Hu06	0.40(3)	100						
2372.373(4)	0 ⁺		>0.21 ps	67Fo10	x	100	0.40(9)					
2451.01(5)	4 ⁺		0.18(4) ps	72Hu06	2	98						
2703.6(4)	$\langle 3 \rangle$			75Bo01			6.6(9)	93(10)				
2762.8(6)	$\langle 2 \rangle$				100							
2765.56(7)	4 ⁺		>7 ps	67Ka11		39(1)	45(1)		16(1)			
2780.18(1)	2 ⁺		0.26(7) ps	72Hu06	64(2)	18(2)	10.9(8)		7(2)			
2826.73(5)	3 ⁻	172	0.18(3) ps	72Hu06		89(7)	11(2)					
2938.10(1)	2 ⁺		0.044(16) ps	68Ok08	41(14)	58(1)	0.33(6)					
3030	$\langle 0^+ \rangle$											
3077.73(23)	4 ⁺	245		67Fo10			23(4)		70(7)		7(2)	
3105.06(1)	0 ⁺			72Hu06	x	6.1(4)	94(3)					
3212.61(1)	2 ⁺		0.083(14) ps	72Hu06	2.0(4)	98(8)						
3226.2(11)				67Ka11								
3228.91(1)	1 ⁺		0.12(3) ps	75Bo01	19.9(1)	72(1)	4.7(5)	1.33(6)				1.38(5)

(continued)

⁶⁶₃₀Zn

E^* [keV]	J^π	σ (¹² C, ¹⁰ Be) $\mu\text{b/sr}$	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage							
					E_f^* : 0.0 J_f^π : 0 ⁺	1039 2 ⁺	1873 2 ⁺	2372 0 ⁺	2451 4 ⁺	2763 <2>	2766 4 ⁺	2780 2 ⁺
3241.2(11)												
3331.47(1)	2 ⁺		0.083(14) ps	72Hu06	2.0(3)	14.2(9)	78(3)					5.7(5)
3380.97(1)	1 ^{<->}		20(5) fs	67Ka11	70(1)	0.15(3)	26.2(4)	2.6(2)				0.63(4)
3427.43(2)	1,2 ⁻						100					
3432.44(1)	1 ^{<->}		30(+19-8) fs	67Ka11	51(1)	42(1)	3.9(3)	2.7(2)				
3507.28(2)	2 ⁺			75Bo01		63(5)	26(4)					
3523.6(8)				67Ka11							100	
3531.73(1)	0 ⁺			72Hu06		100						
3576.40(2)	4 ⁺			72Hu06		34(7)	37(12)					20(4)
3670.73(5)	2 ⁺			67Ka11		15(6)	10(3)		21(4)			
3689.01(16)	1 ⁺⁻ 3 ⁺			68Ok08			100					
3709.4(3)	<5>		0.6(+6-2) ps	67Ka11							100	
3725.3(5)				67Ka11						90		
3731.6(5)				72Hu06							100	
3738.24(2)	1		9.7(+30-18) fs	72Hu06	52(3)	13(2)						
3738.24(4)	<4 ⁺ >			72Hu06								
3747.03(19)	5 ⁻	210	46(3) ps	90Bo27					79(8)		<5	
3753.05(4)	4 ⁺					100						
3770(30)	<1 ⁻ >											
3791.15(1)	1 ⁺			75Bo01	4.01(4)	84(1)	7.53(3)	2.24(3)				0.10(1)
3806.4(10)				67Ka11								
3824.9(3)	0			67Ka11		100						
3874(5)												
3882.46(1)	<2>					23(4)	42(8)	35(15)				
3898.3(6)	5 ⁻			72Hu06								
3924.71(20)				67Ka11		25		75				
3946(2)	<1 ⁻ >			67Ka11								
3969(2)	<4 ⁺ >			67Ka11								
4005(10)	4 ⁺			66Mc15								
4011.7												
4019.2(15)	2 ⁺			72Hu06								100
4075.7(3)	<6 ⁻ >		29.8(14) ps									
4081.0(15)				67Ka11								
4086.01(1)	1			67Ka11	76(1)	3.6(2)	8.1(3)	1.47(7)				0.24(2)
4108.5(10)												
4119.0(5)	<1 ⁻ >			72Hu06		100						
4182.7(5)	<6 ⁺ >		0.15(6) ps						100			
4186(7)	<3 ⁻ >	292		72Hu06								
4223(2)	<1 ⁻ >											
4251.9(3)	<7 ⁻ >		133(10) ps	90Fi07								
4258(2)												
4267(7)	4 ⁺											
4295.37(1)	1 ⁺		4.2(+18-9) fs	67Ka11	62(1)	1.64(9)	29.7(3)					0.10(1)
4321.83(20)						100						
4332(7)	2 ⁺			72Hu06								

(continued)

⁶⁶₃₀Zn

E^* [keV]	J^π	σ (¹² C, ¹⁰ Be) $\mu\text{b/sr}$	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage							
					E_f^* : 0.0 J_f^π : 0 ⁺	1039 2 ⁺	1873 2 ⁺	2372 0 ⁺	2451 4 ⁺	2763 $\langle 2 \rangle$	2766 4 ⁺	2780 2 ⁺
4393.7(16)	3 ⁻		0.07(+4-2) ps	72Hu06		≈50						
4424(6)	1		7.0(12) fs	72Me14	100							
4433(6)	1 ⁻			72Hu06	100							
4439(7)	2 ⁺											
4454(5)												
4461.41(1)	1 ⁺		7(+12-3) fs	72Me14	42.7(4)	44(1)	1.39(8)	0.6(1)				
4472(7)	3 ⁻											
4497.6(5)						100						
4511(5)	0 ⁺			72Hu06								
4511(5)	$\langle 2^+ \rangle$			72Hu06								
4527(5)												
4538(7)	4 ⁺											
4565(2)	3 ⁻											
4567(10)	5 ⁻			72Hu06								
4609(2)	$\langle 1 \rangle$		8.4(+33-18) fs		100							
4610(5)	4 ⁺											
4622(6)					100							
4635.3(11)	$\langle 2 \rangle$						100					
4638.28(14)	1							33(12)				
4645(10)												
4655(7)	$\langle 3^-, 4^+ \rangle$											
4675.6(5)	1						100					
4680(50)												
4683(10)	$\langle 1 \rangle$		7.1(+24-14) fs		100							
4694(7)	4 ⁺											
4730(7)	2 ⁺			68Ok08								
4745(10)												
4758(10)												
4780(7)	5 ⁻			90Fi07								
4796(7)	$\langle 1^- \rangle$											
4806.25(1)	1 ⁺		3.8(+13-8) fs		81(1)	6.8(2)	9.8(2)	0.34(2)				0.12(2)
4814.1(4)	$\langle 7^- \rangle$	125	0.6(4) ps	90Bo27								
4832(10)												
4849.97(3)	1					29(3)	67(11)					
4866.10(2)	1				5.6(5)		67(8)					5(3)
4875(10)												
4885(10)												
4907(10)												
4918(10)												
4945(10)												
4958.3(4)	1						100					
4984(10)												
5005.8(4)	1				100							
5025(10)												
5038(10)												

(continued)

⁶⁶₃₀Zn

E^*	J^π	σ ($^{12}\text{C},^{10}\text{Be}$)	$T_{1/2}$ or	Ref.	Branching ratios in percentage								
[keV]		$\mu\text{b/sr}$	Γ_{cm}		E_f^* :	0.0	1039	1873	2372	2451	2763	2766	2780
					J_f^π :	0 ⁺	2 ⁺	2 ⁺	0 ⁺	4 ⁺	$\langle 2 \rangle$	4 ⁺	2 ⁺
5059(10)													
5073(10)													
5086(10)													
5097(10)													
5106(10)													
5111.9(4)	$\langle 8^- \rangle$												
5124(10)													
5143(10)													
5159(10)													
5169(10)													
5180(10)													
5198(10)													
5207.3(5)	$\langle 8^+ \rangle$	284	>6 ps	90Bo27									
5222(10)													
5234(10)													
5245(10)													
5263(10)													
5274(10)													
5285(10)													
5305(10)													
5322(10)													
5331(10)													
5352(10)													
5364(10)													
5375(10)													
5389(10)													
5403(10)													
5420(10)													
5431(10)													
5446(10)													
5464.4(5)	$\langle 9^- \rangle$		1.9(8) ps										
5500(45)													
5650(30)	3^-												
5740(50)													
6000(50)													
6292.6(6)	$\langle 10^+ \rangle$		1.6(+7-3) ps										
6419.0(8)													
6850(50)	$\langle 8^+ \rangle$	196		90Bo27									
7170(180)													
7367.4(4)	1		1.47(16) fs			71	≈ 0.2	10.2(5)	≤ 0.3				2.7(9)
7517.3(10)			1.5(+6-3) ps										
7550(50)	$\langle 6^+ \rangle$												
7693.3(3)	1		2.2(4) fs			40	17	<1	<1		<1		
11059.9(10)	$2^-, 3^-$												
11395(10)													

(continued)

⁶⁶₃₀Zn

E^*	J^π	σ ($^{12}\text{C}, ^{10}\text{Be}$)	$T_{1/2}$ or	Ref.	Branching ratios in percentage							
[keV]		$\mu\text{b/sr}$	Γ_{cm}	$E_{\text{f}}^*:$ $J_{\text{f}}^\pi:$	0.0 0 ⁺	1039 2 ⁺	1873 2 ⁺	2372 0 ⁺	2451 4 ⁺	2763 $\langle 2 \rangle$	2766 4 ⁺	2780 2 ⁺
11411(10)	$\langle 2^+ \rangle$											
11457(10)												
11514(10)												
11593(10)												
11654(10)												
11698(10)												
11757(10)												
11841(10)												
11916(10)												
12194(10)												
12218(10)												
12293(10)												
12324(10)												
12401(10)												
12433(10)												
12552(10)												
12602(10)												
12651(10)												
12688(10)												
12714(10)												
		90Bo27		Ref. Ref.								

Energy levels and branching ratios [98Bh02]. Part 3

⁶⁶₃₀Zn

E^* [keV]	J^π	Branching ratios in percentage										
		E_f^* : J_f^π :	2826.73 3 ⁻	2938.10 2 ⁺	3077.73 4 ⁺	3105.06 0 ⁺	3212.61 2 ⁺	3226.2	3228.91 1 ⁺	3241.2	3331.47 2 ⁺	3380.98 1 ^{$\langle - \rangle$}
3228.91(1)	1 ⁺			0.70(3)								
3380.97(1)	1 ^{$\langle - \rangle$}			0.72(5)								
3432.44(1)	1 ^{$\langle - \rangle$}			0.96(13)								
3507.28(2)	2 ⁺	11(3)										
3576.40(2)	4 ⁺	9(3)										
3670.73(5)	2 ⁺							54(5)				
3738.24(2)	1			35(18)								
3747.03(19)	5 ⁻	3.9(4)		17(2)								
3791.15(1)	1 ⁺			0.29(3)	0.91(3)	0.21(2)		0.03		0.30(2)	0.24(1)	
3898.3(6)	5 ⁻	100										
4086.01(1)	1			4.6(3)	3.0(2)	1.00(7)		0.8(2)			0.22(2)	
4295.37(1)	1 ⁺			2.7(5)	1.99(6)	0.21(1)		0.04(1)		0.22(2)	0.42(2)	
4393.7(16)	3 ⁻	≈ 50										
4461.41(1)	1 ⁺			0.28(3)	6.4(8)	0.05(2)		2.3(6)		0.69(4)		

(continued)

 $^{66}_{30}\text{Zn}$

E^* [keV]	J^π	Branching ratios in percentage										
		E^*_f : J^π_f :	2826.73 3 ⁻	2938.10 2 ⁺	3077.73 4 ⁺	3105.06 0 ⁺	3212.61 2 ⁺	3226.2	3228.91 1 ⁺	3241.2	3331.47 2 ⁺	3380.98 1 ⁽⁻⁾
4638.28(14)	1								38(16)			
4806.25(1)	1 ⁺			0.12(2)					0.19(2)			0.28(2)
4849.97(3)	1											4.0(11)
4866.10(2)	1			4.8(15)							12(3)	
7367.4(4)	1			1.5(4)		5.8(14)		0.7(4)				
7693.3(3)	1			10(1)		3	8(1)			3(1)	5(1)	

Energy levels and branching ratios [98Bh02]. Part 4

 $^{66}_{30}\text{Zn}$

E^* [keV]	J^π	Branching ratios in percentage										
		E^*_f : J^π_f :	3427.44 1,2 ⁻	3432.44 1 ⁽⁻⁾	3507.28 2 ⁺	3531.73 0 ⁺	3576.40 4 ⁺	3670.73 2 ⁺	3738.24 1	3738.24 <4 ⁺ >	3747.03 5 ⁻	3753.05 4 ⁺
3725.3(5)				10								
3791.15(1)	1 ⁺				0.02							
4075.7(3)	<6 ⁻ >										100	
4086.01(1)	1		0.44(5)	0.08(2)		0.27(3)				0.11(3)		
4251.9(3)	<7 ⁻ >										53(5)	
4295.37(1)	1 ⁺		0.07(1)	0.23(1)		0.14(1)	0.15(1)			0.09(1)		
4461.41(1)	1 ⁺				0.23(3)	0.23(3)	0.10(3)		0.17(3)			0.44(4)
4638.28(14)	1					29(9)						
4806.25(1)	1 ⁺				0.17(2)	0.32(2)		0.21(2)				
4866.10(2)	1			3.8(7)				1.9(7)				
7367.4(4)	1					1.1(5)	≈0.4					
7693.3(3)	1			10(1)	3(1)							

Energy levels and branching ratios [98Bh02]. Part 5

 $^{66}_{30}\text{Zn}$

E^* [keV]	J^π	Branching ratios in percentage									
		E^*_f : J^π_f :	3791.15 1 ⁺	3824.9 0	3882.46 <2>	3898.3 5 ⁻	4011.7	4075.7 <6 ⁻ >	4086.01 1	4182.7 <6 ⁺ >	4251.9 <7 ⁻ >
4251.9(3)	<7 ⁻ >							47(5)			
4295.37(1)	1 ⁺				0.05(1)						
4461.41(1)	1 ⁺		0.21(4)						0.11(3)		
4806.25(1)	1 ⁺		0.54(13)								
4814.1(4)	<7 ⁻ >					31(6)		69(6)			
5111.9(4)	<8 ⁻ >							90(3)			10(3)
5207.3(5)	<8 ⁺ >									55(6)	45(9)
5464.4(5)	<9 ⁻ >										100
7367.4(4)	1			1.1(4)	1.5(5)		0.3(1)	≈0.4			

Energy levels and branching ratios [98Bh02]. Part 6

 $^{66}_{30}\text{Zn}$

E^*	J^π	Branching ratios in percentage						
[keV]		$E_f^*:$ $J_f^\pi:$	4295.38 1^+	4635.3 $\langle 2 \rangle$	5111.9 $\langle 8^- \rangle$	5207.3 $\langle 8^+ \rangle$	5464.4 $\langle 9^- \rangle$	6292.6 $\langle 10^+ \rangle$
6292.6(6)	$\langle 10^+ \rangle$					100	<22	
6419.0(8)					100			
7367.4(4)	1		1.5(9)	1.4(9)				
7517.3(10)								100

Energy levels and branching ratios [91Bh06].

 $^{67}_{30}\text{Zn}$

E^*	$2J^\pi$	$\sigma(\tau, p)$	$\sigma(d, p)$	L	S'	$\sigma(d, p)$	$\sigma(d, p)$	L	S_N	$\sigma(p, d)$	L	S_N	S_N	Ref.
[keV]		$\mu\text{b/sr}$	$\mu\text{b/sr}$		(d, p)	$\mu\text{b/sr}$	$\mu\text{b/sr}$	(p, d)	(p, d)	$\mu\text{b/sr}$		(d, t)	(τ, α)	
0.0	5^-		989	3	2.32	560	520	3	3.8	820	3	3.87	4.80	75Bo01
93.312(5)	1^-			1	0.92*	3800	3000	1		1000	1	0.58	0.90	67Vo05
184.58(1)	3^-		577	1	0.10	290	290	1	0.40	510	1	0.20		77Ab02
393.53(1)	3^-		5000	1	0.86	3700	2700	1	0.19	5100	1	1.90	2.1	66Mc15
604.49(5)	9^+		2006	4	8.19	1100	1100	$\langle 4 \rangle$	0.90	180	4	0.88	0.96	77Ab02
814.77(5)	7^-													
870.9(2)	$3-7$							$\langle 1 \rangle$		70			0.3	63Li06
887.70(1)	5^-					≈ 10					1	0.03**		63Li06
979.84(5)	5^+		4630	2	1.25	3700	2100				2	0.39	0.2	77Ab02
990(20)	$1^-, 3^-$							$\langle 1 \rangle$		110				66Mc15
1060(20)														
1142.8(1)	1^-			1	0.31*	1500	1300	1	0.18	290	1	0.19	0.4	67Vo05
1363.6(1)	5^-										2,3	0.02		81Bi04
1407(5)														
1446.1(1)	3^-			1	0.05*	260	330				1	0.05**		67Vo05
1517.1(2)	9^-													
1543.5(1)	3^-			1	0.025*	120	200				1,2	0.03		77Ab02
1603.7(1)	7^+									30				
1640.2(2)	13^+													
1643(2)						≈ 90								67Vo05
1656.7(1)	7^-					incl							0.42	73DaXY
1677.5(1)	1^+			0	0.19*	7500	2600				0	0.32		67Vo05
1686.8(1)	$3, 5$									160				
1732.7(2)	11^+													
1780.2(2)						≈ 70								67Vo05
1783.2(1)	$\langle 3, 5 \rangle^+$					incl								
1800.5(1)	7^-													
1802(2)	$\langle 1^+ \rangle$			$\langle 0 \rangle$	0.001*	≈ 60					0	0.19**		67Vo05
1807.9(1)	9^+					incl								
1842.8(2)	3^-			$\langle 1 \rangle$	0.012*	70					1	0.05**		67Vo05
1875.4(1)	5^-	5.0								120				
2027.2(1)	7^+													

(continued)

 $^{67}_{30}\text{Zn}$

E^*	$2J^\pi$	$\sigma(\tau, p)$	$\sigma(d, p)$	L	S'	$\sigma(d, p)$	$\sigma(d, p)$	L	S_N	$\sigma(p, d)$	L	S_N	S_N	Ref.
[keV]		$\mu\text{b/sr}$	$\mu\text{b/sr}$		(d, p)	$\mu\text{b/sr}$	$\mu\text{b/sr}$	(p, d)	(p, d)	$\mu\text{b/sr}$		(d, t)	(τ, α)	
2065.4(1)	$3, 5, 7^-$													
2083.1(2)	$1^- - 5^-$													
2092.6(2)		9.7												
2101.8(1)											$\langle 3 \rangle$	0.42		81Bi04
2110	$3^+, 5^+$												0.6	73DaXY
2136.7(1)	$9^{(-)}$													
2158.5(4)														
2175.3(2)		2.6				≈ 40				90	$\langle 0 \rangle$	0.1**		75Bo01
2242.8(2)	$1^+ - 5^-$					≈ 60					$\langle 0 \rangle$	0.3**		75Bo01
2272.9(3)	$3^+, 5^+$		1314	2	0.29	660	760			120				77Ab02
2399(4)	$3^+, 5^+$			2^*		650	660							67Vo05
2408.9(3)	1^+			0^*		4300	2100							67Vo05
2428.1(4)														
2434.9(2)	11^-													
2451.8(2)	13^+													
2487(3)	$\langle 7^+, 9^+ \rangle$		217	$\langle 4 \rangle$	0.70									77Ab02
2503.6(2)	11^+													
2511.4(7)														
2554.5(7)	$1^-, 3^-$	5.0	225	1	0.05									77Ab02
2579(1)	$7^+, 9^+$		183	4	0.58									77Ab02
2599.6(10)	$3^+, 5^+$		327	2	0.069	190								77Ab02
2642(3)	$3^+, 5^+$		250	2	0.052	≈ 100								77Ab02
2732.2(3)	11^-													
2753(2)														
2794(2)	$3^+, 5^+$		1457	2	0.300	880	1000							77Ab02
2847(3)	1^+		1032	0	0.027	200				70				77Ab02
2883(12)														
2926.5(5)	$\langle 15^+ \rangle$													
2928.3(2)														
2937.3(5)														
2998(12)														
3029.8(3)	$\langle 11^+, 15^+ \rangle$													
3057(7)		12.0												
3065.7(5)	13^-													
3091(12)														
3119(12)														
3153(12)														
3195.6(4)		9.0												
3228(2)	$3^+, 5^+$			2	0.07*	330	410							67Vo05
3291(5)	1^+			0	0.03*	1400	800							67Vo05
3326(12)														
3350														
3386(2)	1^+			0	0.1*	4400								67Vo05
3429(12)														
3468(3)	$3^+, 5^+$		599	2	0.11	300								77Ab02

(continued)

 $^{67}_{30}\text{Zn}$

E^*	$2J^\pi$	$\sigma(\tau, p)$	$\sigma(d, p)$	L	S'	$\sigma(d, p)$	$\sigma(d, p)$	L	S_N	$\sigma(p, d)$	L	S_N	S_N	Ref.
[keV]		$\mu\text{b/sr}$	$\mu\text{b/sr}$		(d, p)	$\mu\text{b/sr}$	$\mu\text{b/sr}$	(p, d)	(p, d)	$\mu\text{b/sr}$		(d, t)	(τ, α)	
3473.4(11)	$\langle 11^-, 13^- \rangle$													
3487.5(4)														
3490.0(5)														
3490.8(6)														
3534(2)	$3^+, 5^+$		4397	2	0.79	4000								77Ab02
3557(5)	1^+		7421	0	0.21	>2000								77Ab02
3599(3)	1^+		4680	0	0.134	>850								77Ab02
3637(2)														
3642(4)						≈ 100								67Vo05
3679(20)		1.9				≈ 200								67Vo05
3696.7(6)												0.2, 0.4		73DaXY
3699(3)	$3^+, 5^+$		412	2	0.072									77Ab02
3764(3)	1^+		4341	0	0.129	≈ 900								77Ab02
3785(20)														
3819(3)														
3832(3)														
3857(2)	1^+		3710	0	0.113	>520				40				77Ab02
3880										incl			0.6, 1.0	73DaXY
3907(4)														
3929.2(6)														
3946(2)														
3981(2)														
4024(3)														
4074(2)	1^+		7696	0	0.247									77Ab02
4115(5)														
4135(5)														
4186(3)	$3^+, 5^+$		456	2	0.073									77Ab02
4220.0(6)														
4225(4)														
4257(4)	$3^+, 5^+$		1580	2	0.25									77Ab02
4286(4)														
4307(4)	$3^+, 5^+$		1242	2	0.196									77Ab02
4315(20)	$\langle 5^-, 7^- \rangle$	32.0										0.34		73DaXY
4368(3)														
4388(3)	$3^+, 5^+$		934	2	0.145									77Ab02
4419(4)	$3^+, 5^+$		926	2	0.143									77Ab02
4457(5)														
4480	$\langle 5^-, 7^- \rangle$											0.22		73DaXY
4500(3)	$3^+, 5^+$		1710	2	0.26									77Ab02
4556(6)	$\langle 5^-, 7^- \rangle$											0.15		73DaXY
4593(8)														
4630.1(8)	$\langle 21^+ \rangle$													
4660(30)	$\langle 5^-, 7^- \rangle$											0.13		73DaXY
4684.1(7)	$\langle 21^- \rangle$													
4770(30)												0.20		73DaXY

(continued)

⁶⁷₃₀Zn

E^*	$2J^\pi$	$\sigma(\tau, p)$	$\sigma(d, p)$	L	S'	$\sigma(d, p)$	$\sigma(d, p)$	L	S_N	$\sigma(p, d)$	L	S_N	S_N	Ref.
[keV]		$\mu\text{b/sr}$	$\mu\text{b/sr}$		(d, p)	$\mu\text{b/sr}$	$\mu\text{b/sr}$	(p, d)	(p, d)	$\mu\text{b/sr}$		(d, t)	(τ, α)	
5010(30)														
5070(20)		20.0												
5150(30)														
5210(20)														
5340(30)														
9020														
9280													0.31	67Bo39
11470														67Bo39
		74Is01	83Mo26	77Ab02		74Is01		66Mc15				81Bi04	73DaXY	Ref.
			77Ab02			67Vo05				66Mc15		75Bo01	67Bo39	Ref.

Additional data on this isotope can be found in [81Bi04, 63Li06].

Abundance: 4.10(13) %.* L and $(2J+1)S=(2J+1)S_n^+$ are from [67Vo05] normalized in [91Bh06] to those of [77Ab02].** Assuming values L from [75Bo01] with $2p_{3/2}$ neutron transfer for $L=1$ [91Bh06].Cross sections of two-nucleon transfer reaction (τ, p) are given first [74Is01]; neutron transfer parameters from deuteron stripping [77Ab02, 67Vo05, 74Is01] are given in the center.Data for three neutron pickup reactions (p, d) [66Mc15], (d, t) [81Bi04, 75Bo01] and (τ, α) [73DaXY, 67Bo39] are given together at right.Parameter S_N for (p, d) reaction is a ratio $d\sigma/d\Omega(\text{exp})_{\text{max}}/d\sigma/d\Omega\text{DWBA}(\text{max})$ [66Mc15].

Energy levels and branching ratios [91Bh06]. Part 2

⁶⁷₃₀Zn

E^*	$2J^\pi$	L	$T_{1/2}$ or	Ref.	Branching ratios in percentage								
[keV]			Γ_{cm}		E_f^* :	0.0	93.3	185	393	604	815	888	980
					$2J_f^\pi$:	5 ⁻	1 ⁻	3 ⁻	3 ⁻	9 ⁺	7 ⁻	5 ⁻	5 ⁺
0.0	5 ⁻	3	Stable	75Bo01									
93.312(5)	1 ⁻	1	9.16 μs	67Vo05		100							
184.58(1)	3 ⁻		1.04(2) ns	77Ab02		87(2)	13						
393.53(1)	3 ⁻	1	>2.4 ps	66Mc15		20(1)	70	9.9(3)					
604.49(5)	9 ⁺	4	333(14) ns	77Ab02		100							
814.77(5)	7 ⁻		2.0(7) ps			94(3)		5.1(2)	0.7				
870.9(2)	3-7	$\langle 3 \rangle$		63Li06		100							
887.70(1)	5 ⁻		1.6(2) ps	63Li06		49(2)	21	5(2)	25				
979.84(5)	5 ⁺	$\langle 1 \rangle$	1.5(3) ps	77Ab02		31(3)			65	4(1)			
990(20)	1 ⁻ , 3 ⁻			66Mc15									
1060(20)													
1142.8(1)	1 ⁻	1	0.4(1) ps	67Vo05		9(1)		46(2)	45				
1363.6(1)	5 ⁻	1+3	0.18(6) ps	81Bi04		27(4)	4	26(3)	35			8(1)	
1407(5)													
1446.1(1)	3 ⁻		0.5(1) ps	67Vo05		25	59	<31	4			12	
1517.1(2)	9 ⁻		0.21(6) ps			92(3)					8(3)		
1543.5(1)	3 ⁻		0.19(5) ps	77Ab02		54	10	32	4				

(continued)

⁶⁷Zn
₃₀

E^* [keV]	$2J^\pi$	L	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage								
					E_f^* : $2J_f^\pi$:	0.0 5 ⁻	93.3 1 ⁻	185 3 ⁻	393 3 ⁻	604 9 ⁺	815 7 ⁻	888 5 ⁻	980 5 ⁺
1603.7(1)	7 ⁺		0.42(7) ps							85			15
1640.2(2)	13 ⁺		0.83(3) ps							100			
1643(2)				67Vo05									
1656.7(1)	7 ⁻	3	0.4(1) ps	73DaXY		33(4)		14(2)	<61			53(6)	
1677.5(1)	1 ⁺		0.15(4) ps	67Vo05			31	4	42		24		
1686.8(1)	3,5		0.24(8) ps			36(5)		26(5)	38				
1732.7(2)	11 ⁺		0.48(7) ps							100			
1780.2(2)				67Vo05				40			60	<17	
1783.2(1)	$\langle 3,5 \rangle^+$		0.29(6) ps			1	97	0	1				1
1800.5(1)	7 ⁻		0.12(4) ps			31(3)		24(3)	18			27(3)	
1802(2)	$\langle 1^+ \rangle$			67Vo05									
1807.9(1)	9 ⁺		>0.7 ps			26				51	11		12
1842.8(2)	3 ⁻		0.17(8) ps	67Vo05			4	52	29			5	
1875.4(1)	5 ⁻		0.13(4) ps				x		21		79(2)		
2027.2(1)	7 ⁺		1.2(5) ps			40				20			40
2065.4(1)	3,5,7 ⁻		2.4(11) ps			4			87				9
2083.1(2)	1 ⁻ -5 ⁻		30(8) fs			15(2)	20(2)	25(3)	39				
2092.6(2)			55(21) fs					100					
2101.8(1)				81Bi04		23					<92	65	
2110	3 ⁺ ,5 ⁺	2		73DaXY									
2136.7(1)	9 ⁽⁻⁾		0.9(3) ps			15(2)					85(10)		
2158.5(4)			40(14) fs					100					
2175.3(2)				75Bo01					x				[100]
2242.8(2)	1 ⁺ -5 ⁻		45(7) fs	75Bo01					75				
2272.9(3)	3 ⁺ ,5 ⁺		0.3(1) fs	77Ab02					x				
2399(4)	3 ⁺ ,5 ⁺			67Vo05									
2408.9(3)	1 ⁺			67Vo05				x	x				
2428.1(4)									100				
2434.9(2)	11 ⁻		0.30(8) ps								58(7)	21(3)	
2451.8(2)	13 ⁺		0.8(3) ps										
2487(3)	$\langle 7^+, 9^+ \rangle$			77Ab02									
2503.6(2)	11 ⁺		0.38(8) ps							33			
2511.4(7)						x					x		
2554.5(7)	1 ⁻ ,3 ⁻			77Ab02		x		x					
2579(1)	7 ⁺ ,9 ⁺			77Ab02									
2599.6(10)	3 ⁺ ,5 ⁺			77Ab02				x					
2642(3)	3 ⁺ ,5 ⁺			77Ab02									
2732.2(3)	11 ⁻		0.41(8) ps										
2753(2)													
2794(2)	3 ⁺ ,5 ⁺			77Ab02									
2847(3)	1 ⁺			77Ab02									
2883(12)													
2926.5(5)	$\langle 15^+ \rangle$												
2928.3(2)													
2937.3(5)													

(continued)

⁶⁷Zn
₃₀

E^*	$2J^\pi$	L	$T_{1/2}$ or	Ref.	Branching ratios in percentage								
[keV]			Γ_{cm}		E_{f}^* :	0.0	93.3	185	393	604	815	888	980
					$2J_{\text{f}}^\pi$:	5 ⁻	1 ⁻	3 ⁻	3 ⁻	9 ⁺	7 ⁻	5 ⁻	5 ⁺
2998(12)													
3029.8(3)	$\langle 11^+, 15^+ \rangle$												
3057(7)													
3065.7(5)	13 ⁻		0.28(2) ps										
3091(12)													
3119(12)													
3153(12)													
3195.6(4)													
3228(2)	3 ⁺ , 5 ⁺			67Vo05									
3291(5)	1 ⁺			67Vo05									
3326(12)													
3350													
3386(2)	1 ⁺			67Vo05									
3429(12)													
3468(3)	3 ⁺ , 5 ⁺			77Ab02									
3473.4(11)	$\langle 11^-, 13^- \rangle$												
3487.5(4)			<40 fs										
3490.0(5)													
3490.8(6)													
3534(2)	3 ⁺ , 5 ⁺			77Ab02									
3557(5)	1 ⁺			77Ab02									
3599(3)	1 ⁺			77Ab02									
3637(2)													
3642(4)				67Vo05									
3679(20)				67Vo05									
3696.7(6)		3		73DaXY									
3699(3)	3 ⁺ , 5 ⁺			77Ab02									
3764(3)	1 ⁺			77Ab02									
3785(20)													
3819(3)													
3832(3)													
3857(2)	1 ⁺			77Ab02									
3880		3		73DaXY									
3907(4)													
3929.2(6)													
3946(2)													
3981(2)													
4024(3)													
4074(2)	1 ⁺			77Ab02									
4115(5)													
4135(5)													
4186(3)	3 ⁺ , 5 ⁺			77Ab02									
4220.0(6)													
4225(4)													
4257(4)	3 ⁺ , 5 ⁺			77Ab02									

(continued)

⁶⁷Zn
30

E^*	$2J^\pi$	L	$T_{1/2}$ or	Ref.	Branching ratios in percentage								
[keV]			Γ_{cm}		E_f^* :	0.0	93.3	185	393	604	815	888	980
					$2J_f^\pi$:	5 ⁻	1 ⁻	3 ⁻	3 ⁻	9 ⁺	7 ⁻	5 ⁻	5 ⁺
4286(4)													
4307(4)	3 ⁺ ,5 ⁺			77Ab02									
4315(20)	$\langle 5^-,7^- \rangle$	$\langle 3 \rangle$		73DaXY									
4368(3)													
4388(3)	3 ⁺ ,5 ⁺			77Ab02									
4419(4)	3 ⁺ ,5 ⁺			77Ab02									
4457(5)													
4480	$\langle 5^-,7^- \rangle$	$\langle 3 \rangle$		73DaXY									
4500(3)	3 ⁺ ,5 ⁺			77Ab02									
4556(6)	$\langle 5^-,7^- \rangle$	$\langle 3 \rangle$		73DaXY									
4593(8)													
4630.1(8)	$\langle 21^+ \rangle$												
4660(30)	$\langle 5^-,7^- \rangle$	$\langle 3 \rangle$		73DaXY									
4684.1(7)	$\langle 21^- \rangle$												
4770(30)		$\langle 3 \rangle$		73DaXY									
5010(30)													
5070(20)													
5150(30)													
5210(20)													
5340(30)													
9020													
9280		$\langle 1 \rangle$		67Bo39									
11470		$\langle 3 \rangle$		67Bo39									
				Ref.									
				Ref.									

Energy levels and branching ratios [91Bh06]. Part 3

⁶⁷Zn
30

E^* [keV]	$2J^\pi$	E_f^* : $2J_f^\pi$:	Branching ratios in percentage									
			1142.8 1 ⁻	1363.6 5 ⁻	1446.1 3 ⁻	1517.1 9 ⁻	1543.5 3 ⁻	1603.7 7 ⁺	1640.2 13 ⁺	1732.7 11 ⁺	2451.8 13 ⁺	2926.5 ⟨15 ⁺ ⟩
1842.8(2)	3 ⁻		≈10									
1875.4(1)	5 ⁻			x								
2101.8(1)				12								
2242.8(2)	1 ⁺ -5 ⁻		25									
2272.9(3)	3 ⁺ ,5 ⁺							x				
2408.9(3)	1 ⁺		x									
2434.9(2)	11 ⁻		21(2)									
2451.8(2)	13 ⁺									[100]		
2503.6(2)	11 ⁺								67			
2732.2(3)	11 ⁻					100						
2926.5(5)	⟨15 ⁺ ⟩								100			

(continued)

 $^{67}_{30}\text{Zn}$

E^* [keV]	$2J^\pi$	Branching ratios in percentage										
		E_f^* : $2J_f^\pi$:	1142.8 1^-	1363.6 5^-	1446.1 3^-	1517.1 9^-	1543.5 3^-	1603.7 7^+	1640.2 13^+	1732.7 11^+	2451.8 13^+	2926.5 $\langle 15^+ \rangle$
2928.3(2)					42(9)		58					
2937.3(5)										100		
3029.8(3)	$\langle 11^+, 15^+ \rangle$								45(4)	55(4)		
3065.7(5)	13^-					100						
3195.6(4)											100	
3487.5(4)									100			
3490.0(5)												100
3490.8(6)									80		20	
3696.7(6)											100	
4220.0(6)												100
4630.1(8)	$\langle 21^+ \rangle$											100

Energy levels and branching ratios [91Bh06]. Part 4

 $^{67}_{30}\text{Zn}$

E^* [keV]	$2J^\pi$	Branching ratios in percentage				
		E_f^* : $2J_f^\pi$:	3065.7 13^-	3487.5	3929.2	4220.0
3473.4(11)	$\langle 11^-, 13^- \rangle$		100			
3929.2(6)			90(5)	10(5)		
4684.1(7)	$\langle 21^- \rangle$				67(3)	33(3)

Energy levels and branching ratios [02Bu29].

 $^{68}_{30}\text{Zn}$

E^* [keV]	J^π	S_α	L	L	σ (t,p) $\mu\text{b/sr}$	S'' (d,p)	σ (d,p) $\mu\text{b/sr}$	L	S'' (d,p)	L	C^2S (d, τ)	$\beta_L R$ (α, α')	Ref.
0.0	0^+	0.28	0	0	4800	0.374	140	3^{**}	0.72	1	0.42		85Do06
1077.37(4)	2^+	0.056	2	2	119	0.092	440	1^*	0.17	1	0.65	1.03(5)	85Do06
1655.91(8)	0^+			0	59					1	0.011		77Ro22
1883.20(5)	2^+	0.034	2		18	0.063	360	1^*	0.14	1	0.1		85Do06
										+3	0.07		77Ro22
2338.45(5)	2^+			2	163	0.083	500	1	0.04	1	0.64		85Do06
2370.3(15)													
2417.40(6)	$\langle 4 \rangle^+$	0.031	$\langle 4 \rangle$		19			$\langle 3 \rangle$	0.10	3	0.20		85Do06
2510.2(15)													
2750.76(8)	3^-	0.039	3	3	79			4	0.35			1.03(5)	85Do06
2821.79(8)	2^+			2	27	0.026	340	1	0.10	1	0.11		85Do06
2955.9(22)				4	33			$\langle 1 \rangle$	0.02				85Do06
2959.5(1)	$\langle 4^+ \rangle$	0.014	4			0.025	300	$\langle 3 \rangle$	0.31	$\langle 3 \rangle$	$\langle 0.2 \rangle$	0.46(3)	85Do06

(continued)

⁶⁸Zn
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E^*	J^π	S_α	L	L	σ (t,p)	S''	σ (d,p)	L	S''	L	C^2S	β_LR	Ref.
[keV]		(⁶ Li,d)	(⁶ Li,d)	(t,p)	$\mu\text{b/sr}$	(d,p)	$\mu\text{b/sr}$		(d,p)	(d, τ)	(d, τ)	(α, α')	
3009.27(7)	$\langle 3 \rangle^+$							1	0.02	1	0.075		85Do06
3102.5(1)	0^+			0	41								72Hu06
3153.8(4)				0	530								72Hu06
3160.1(3)													
3164.4(14)												0.17(2)	
3184.18(13)	$1,2^+$					0.105	360	2	0.11	1	0.29		63Li06
3186.6(11)	$\langle 1,2^+ \rangle$												
3281.58(16)	4^+			4	15	0.088	900	$\langle 1 \rangle^*$	0.04	[3]	0.067		85Do06
3287.1(1)	$1,2^+$									[1]	0.019		77Ro22
3346.1(2)	1^+									1	0.11		77Ro22
3386(3)													
3400.9(5)	$1,2^+$									1	0.1		
										+3	0.1		
3425.1(2)	$\langle 2-4 \rangle^+$			2	27			1	0.58	[3]	0.024		85Do06
3429.5(2)	$\langle 1,2^+ \rangle$									[1]	0.01		77Ro22
3451.0(3)													
3458.8(2)	5^-	0.011	$\langle 5 \rangle$	5	29	0.33	2600	4	1.5			0.35(3)	85Do06
3487.7(15)	$\langle 2-4 \rangle^+$				15					[1]	0.014		77Ro22
3496.1(1)	$3^+, 4^+$				incl					[3]	0.05		77Ro22
3586.6(1)	4^+			$\langle 4 \rangle$	9			1	0.13				85Do06
3610.8(6)	$\langle 6 \rangle^-$					0.358	1340	4	1.7				85Do06
3620(10)	3^-			3	28								72Hu06
3624.3(2)	$\langle 1,2^+ \rangle$												
3630.3(1)	$\langle 2^+ \rangle$												
3664.7(3)	$\langle 1,2^+ \rangle$							1	0.24	1	0.043		85Do06
3687.5(5)	$\langle 6^+ \rangle$			$\langle 5 \rangle$	14								72Hu06
3709.8(3)	$\langle 2^+ \rangle$			0+4	18								72Hu06
3717.5(2)	$1,2^+$				32								72Hu06
3725.8(2)						0.302	2640					0.27(4)	
3732.4(10)													
3776.3(2)	$\langle 1,2^+ \rangle$	0.073	$\langle 1 \rangle$										79Ba11
3806(10)	$\langle 3^- \rangle$			$\langle 3 \rangle$									
3814.8(2)	1^-							4	0.41				85Do06
3849.3(2)	4^+			4	34			1	0.056				85Do06
3895.8(2)	4^+			4	34								72Hu06
3911.0(2)	X^-							4	0.58				85Do06
3929(4)					59								72Hu06
3935.1(2)	3^+				incl								72Hu06
3942.9(8)	$\langle 8^- \rangle$							4	3.0				85Do06
3970.7(12)	X^+												
3989(5)								[4]	[0.9]				85Do06
4027.7(4)	$\langle 2^+ \rangle$							$\langle 1 \rangle$	0.16				85Do06
4061.0(3)	$\langle 2^+ \rangle$			$\langle 2 \rangle$	48			1	0.087				85Do06
4102(5)													
4110	4^+												

(continued)

⁶⁸₃₀Zn

E^*	J^π	S_α	L	L	σ (t,p)	S''	σ (d,p)	L	S''	L	C^2S	$\beta_L R$	Ref.
[keV]		(⁶ Li,d)	(⁶ Li,d)	(t,p)	$\mu\text{b/sr}$	(d,p)	$\mu\text{b/sr}$		(d,p)	(d, τ)	(d, τ)	(α, α')	
4124(10)	4 ⁻ -6 ⁻					0.595	2500	[2]	[0.6]				63Li06
4139.2(17)	1,2 ⁺												
4148(7)	0 ⁺			0	43								
4215.4(6)	$\langle 1,2 \rangle^+$							1	0.052				85Do06
4229(4)													
4234(4)	X ⁽⁻⁾												
4284.0(4)	$\langle 1,2^+ \rangle$				118								72Hu06
4325(6)													
4339.1(20)	1,2 ⁺												
4345(10)	3 ⁺ -5 ⁺												
4355(10)	X ⁻					0.208	900	2	0.13				85Do06
4389(10)	3 ⁺ ,4 ⁺												
4396.8(7)	$\langle 8^+ \rangle$					0.165	720	1	0.072				90Fi07
4408.4(4)													
4414(6)	1 ⁺ -3 ⁺												
4437(5)	X ⁻							2	0.035				85Do06
4444(6)	X ⁺												
4466.2(20)	1 ⁻							2	0.075				85Do06
4496(6)													
4503.2(20)	$\langle 1 \rangle$												
4512.2(3)	$\langle 2^+ \rangle$												
4520.6(4)	1,2 ⁺												
4535.6(4)	1,2 ⁺												
4578(6)													
4587(4)	1 ⁺ -3 ⁺												
4608(6)	X ⁻					0.163	1960	2	0.061				85Do06
4642(4)													
4670(6)	2 ⁻ ,3 ⁻							0	0.031				85Do06
4680(6)													
4724.1(5)	1 ⁺ -3 ⁺												
4732.8(11)	1,2 ⁺												
4743(5)	2 ⁻ ,3 ⁻					0.154	3060	0	0.077				85Do06
4792(6)													
4851.2(6)	2 ⁻ ,3 ⁻							0	0.028				85Do06
4857.9(6)	1,2 ⁺												
4865.9(8)	$\langle 10^- \rangle$												
4873(4)	2 ⁻ -4 ⁻												
4910.6(4)	1,2 ⁺												
4951.5(4)	1 ⁻ -3 ⁻							2	0.090				85Do06
4963.0(7)													
4982(6)													
4992.0(10)	1,2 ⁺	0.07	$\langle 1 \rangle$										79Ba11
5019(10)	X ⁻					0.073	360	2	0.086				85Do06
5120(10)	X ⁻					0.088	450	2	0.061				85Do06
5146(5)													

(continued)

⁶⁸₃₀Zn

E^*	J^π	S_α	L	L	σ (t,p)	S''	σ (d,p)	L	S''	L	C^2S	$\beta_L R$	Ref.
[keV]		(⁶ Li,d)	(⁶ Li,d)	(t,p)	$\mu\text{b/sr}$	(d,p)	$\mu\text{b/sr}$		(d,p)	(d, τ)	(d, τ)	(α, α')	
5162(10)													
5187.7(7)													
5200(10)	$2^-, 3^-$							0	0.038				85Do06
5283.4(6)													
5298.0(4)	$1^-, 2^+$												
5307.5(10)	X^-							2	0.10				85Do06
5400.4(5)													
5403.2(5)	$1, 2^+$												
5415.3(8)	$1, 2^+$												
5420	$2^-, 3^-$					0.149	3020	0					63Li06
5565.0(8)													
5610	$2^-, 3^-$					0.070	1480	0					63Li06
5635(10)													85Do06
5693.8(6)													
5860	X^-					0.183	1100	2					63Li06
5990.7(9)	$\langle 12^- \rangle$												
6760	X^-					0.50	3600	2					63Li06
7110	$2^-, 3^-$					0.48	8660	0					63Li06
0+X	$J \approx \langle 17 \rangle$												
7362.3(5)	1^-												
1506.0+X	$J+2$												
3223.0+X	$J+4$												
5141.1+X	$J+6$												
7262.1+X	$J+8$												
9593.1+X	$J+10$												
12148.2+X	$J+12$												
14943+X	$J+14$												
18016+X	$J+16$												
		79Ba11			72Hu06				85Do06		77Ro22	71Al18	Ref.
		02Bu29				63Li06	63Li06						Ref.

Additional data on this isotope can be found in [00Wi18, 87Ja05].

Abundance: 18.75(51) %.

* j of the transferred neutron is 1/2 [78Ba13, 02Bu29].

** j of the transferred neutron is 5/2 [78Ba13, 02Bu29].

Parameter $S_\alpha = \sigma_{exp} / \sigma_{DWBA}$ in the first column has a meaning of S_N in the case of α -particle transfer reaction [79Ba11], see comments in [02Bu29].

Parameter $N = (d\sigma/d\Omega \text{ (exp)}) / (d\sigma/d\Omega \text{ (DWBA)})$ has a meaning of S_N in the case of two-neutron transfer reaction ($\alpha, {}^2\text{He}$) [90Fi07].

Spectroscopic strength $S'_j = S''$ is related to the usual spectroscopic factor S_j by $(2j+1)S'_j = (2J_f + 1)(2I + 1)^{-1}S_j$ where $I = I_i$ is the initial spin of nuclei.

Energy levels and branching ratios [02Bu29]. Part 2

⁶⁸₃₀Zn

E^* [keV]	J^π	N ($\alpha, {}^2\text{He}$)	$T_{1/2}$ or Γ_{cm}	Ref.	E_f^* : J_f^π :	0.0 0 ⁺	1077 2 ⁺	1656 0 ⁺	1883 2 ⁺	2338 2 ⁺	2370
0.0	0 ⁺	3900(3000)	Stable	85Do06							
1077.37(4)	2 ⁺		1.57(4) ps	85Do06		100					
1655.91(8)	0 ⁺		70(35) ps	77Ro22		x	100				
1883.20(5)	2 ⁺		1.6(3) ps	85Do06		59(1)	41(1)	0.05(2)			
				77Ro22							
2338.45(5)	2 ⁺		0.24(+11-6) ps	85Do06		1.2(2)	99(2)	0.33(2)			
2370.3(15)							100				
2417.40(6)	$\langle 4 \rangle^+$			85Do06			99(3)		0.6(2)		
2510.2(15)							100				
2750.76(8)	3 ⁻		0.44(+10-8) ps	85Do06			93(6)			7.1(6)	
2821.79(8)	2 ⁺		0.15(3) ps	85Do06		4.5(4)	91(5)	0.15(9)	1.7(2)	2.6(3)	
2955.9(22)				85Do06							100
2959.5(1)	$\langle 4^+ \rangle$			85Do06			89(24)				
3009.27(7)	$\langle 3 \rangle^+$		0.28(+14-8) ps	85Do06			9.6(10)		82(4)	3.9(5)	
3102.5(1)	0 ⁺			72Hu06			≤ 3		100		
3153.8(4)				72Hu06					40(7)	60(12)	
3160.1(3)							[100]				
3164.4(14)											
3184.18(13)	1,2 ⁺		22(6) fs	63Li06		20(2)	61(9)		15(1)	4.0(9)	
3186.6(11)	$\langle 1,2^+ \rangle$						64(18)	36(11)			
3281.58(16)	4 ⁺			85Do06					17(4)		
3287.1(1)	1,2 ⁺		0.08(+2-1) ps	77Ro22		29(3)	59(7)	8.6(8)	2.6(8)		
3346.1(2)	1 ⁺		8.4(22) fs	77Ro22		62(11)	21(7)		17(6)		
3386(3)						23(13)	77(38)				
3400.9(5)	1,2 ⁺		45(+17-14) fs			11(6)	47(21)		42(10)		
3425.1(2)	$\langle 2-4 \rangle^+$			85Do06			65(10)		35(3)		
3429.5(2)	$\langle 1,2^+ \rangle$			77Ro22		6(2)	26(5)		53(4)	15(1)	
3451.0(3)							47(12)			31(9)	
3458.8(2)	5 ⁻			85Do06							
3487.7(15)	$\langle 2-4 \rangle^+$			77Ro22							
3496.1(1)	3 ⁺ , 4 ⁺		62(10) fs	77Ro22			92(11)		5.0(14)		
3586.6(1)	4 ⁺			85Do06			32(9)				
3610.8(6)	$\langle 6 \rangle^-$			85Do06							
3620(10)	3 ⁻			72Hu06							
3624.3(2)	$\langle 1,2^+ \rangle$					21(10)	79(19)				
3630.3(1)	$\langle 2^+ \rangle$					29(3)					
3664.7(3)	$\langle 1,2^+ \rangle$			85Do06		18(4)	32(9)		50(5)		
3687.5(5)	$\langle 6^+ \rangle$			72Hu06							
3709.8(3)	$\langle 2^+ \rangle$			72Hu06		42(6)				58(11)	
3717.5(2)	1,2 ⁺		23(8) fs	72Hu06		63(6)		37(6)			
3725.8(2)			33(+9-6) fs				53(16)			34(3)	
3732.4(10)											
3776.3(2)	$\langle 1,2^+ \rangle$			79Ba11		51(9)	18(6)			31(3)	
3806(10)	$\langle 3^- \rangle$										

(continued)

⁶⁸Zn
₃₀

E^*	J^π	N	$T_{1/2}$ or	Ref.	Branching ratios in percentage						
[keV]		$(\alpha, {}^2\text{He})$	Γ_{cm}		$E_f^*:$ $J_f^\pi:$	0.0 0 ⁺	1077 2 ⁺	1656 0 ⁺	1883 2 ⁺	2338 2 ⁺	2370
3814.8(2)	1 ⁻		24(+8-6) fs	85Do06		15(4)	85(14)				
3849.3(2)	4 ⁺		0.16(+15-6) ps	85Do06						12(5)	
3895.8(2)	4 ⁺			72Hu06						6(3)	
3911.0(2)	X ⁻			85Do06					41(6)	9(3)	
3929(4)				72Hu06			100				
3935.1(2)	3 ⁺			72Hu06		4(2)	74(21)			5.6(15)	
3942.9(8)	$\langle 8^- \rangle$	[40]		85Do06							
3970.7(12)	X ⁺										
3989(5)				85Do06		100					
4027.7(4)	$\langle 2^+ \rangle$			85Do06		70(10)					
4061.0(3)	$\langle 2^+ \rangle$		62(+21-17) fs	85Do06			61(9)			39(12)	
4102(5)						100					
4110	4 ⁺										
4124(10)	4 ⁻ -6 ⁻			63Li06							
4139.2(17)	1,2 ⁺		33(+12-9) fs			16(8)	84(8)				
4148(7)	0 ⁺										
4215.4(6)	$\langle 1,2 \rangle^+$			85Do06		21(8)	79(11)				
4229(4)							100				
4234(4)	X ⁽⁻⁾						100				
4284.0(4)	$\langle 1,2^+ \rangle$			72Hu06			63(9)				
4325(6)						100					
4339.1(20)	1,2 ⁺		12(3) fs			100					
4345(10)	3 ⁺ -5 ⁺										
4355(10)	X ⁻			85Do06							
4389(10)	3 ⁺ ,4 ⁺										
4396.8(7)	$\langle 8^+ \rangle$	50(15)		90Fi07							
4408.4(4)							88(9)				
4414(6)	1 ⁺ -3 ⁺					100					
4437(5)	X ⁻			85Do06			100				
4444(6)	X ⁺					100					
4466.2(20)	1 ⁻		7.0(21) fs	85Do06		100					
4496(6)						100					
4503.2(20)	$\langle 1 \rangle$		12(4) fs			[100]					
4512.2(3)	$\langle 2^+ \rangle$					31(5)	30(6)				
4520.6(4)	1,2 ⁺					58(5)				27(5)	
4535.6(4)	1,2 ⁺					23(5)	77(9)				
4578(6)						100					
4587(4)	1 ⁺ -3 ⁺					22(7)	78(12)				
4608(6)	X ⁻			85Do06		100					
4642(4)						23(10)	56(10)			21(17)	
4670(6)	2 ⁻ ,3 ⁻			85Do06		38(25)	62(38)				
4680(6)						100					
4724.1(5)	1 ⁺ -3 ⁺					62(9)					
4732.8(11)	1,2 ⁺					17(5)	20(10)	45(9)			
4743(5)	2 ⁻ ,3 ⁻			85Do06			100				

(continued)

⁶⁸Zn
₃₀

E^*	J^π	N	$T_{1/2}$ or	Ref.	E_f^* :	0.0	Branching ratios in percentage					
[keV]		$(\alpha, {}^2\text{He})$	Γ_{cm}		J_f^π :	0^+	1077	1656	1883	2338	2370	
							2^+	0^+	2^+	2^+		
4792(6)						100						
4851.2(6)	$2^-, 3^-$			85Do06						80(24)		
4857.9(6)	$1, 2^+$					53(8)		47(11)				
4865.9(8)	$\langle 10^- \rangle$											
4873(4)	$2^-, 4^-$											
4910.6(4)	$1, 2^+$						81(9)	10(4)	9(4)			
4951.5(4)	$1^-, 3^-$			85Do06			60(14)		22(5)			
4963.0(7)							100					
4982(6)						100						
4992.0(10)	$1, 2^+$			79Ba11		29(6)	38(11)		33(16)			
5019(10)	X^-			85Do06								
5120(10)	X^-			85Do06								
5146(5)							100					
5162(10)												
5187.7(7)							24(11)					
5200(10)	$2^-, 3^-$			85Do06								
5283.4(6)									25(8)	25(7)		
5298.0(4)	$1^-, 2^+$					10(2)	10(5)		31(9)	15(4)		
5307.5(10)	X^-			85Do06				100				
5400.4(5)												
5403.2(5)	$1, 2^+$					43(6)			57(12)			
5415.3(8)	$1, 2^+$					36(6)	64(24)					
5420	$2^-, 3^-$			63Li06								
5565.0(8)										48(7)		
5610	$2^-, 3^-$			63Li06								
5635(10)				85Do06								
5693.8(6)												
5860	X^-			63Li06								
5990.7(9)	$\langle 12^- \rangle$											
6760	X^-			63Li06								
7110	$2^-, 3^-$			63Li06								
0+X	$J \approx \langle 17 \rangle$											
7362.3(5)	1^-		0.240(10) fs			x	x	x				
1506.0+X	$J+2$											
3223.0+X	$J+4$											
5141.1+X	$J+6$											
7262.1+X	$J+8$											
9593.1+X	$J+10$											
12148.2+X	$J+12$											
14943+X	$J+14$											
18016+X	$J+16$											
		90Fi07		Ref.								
				Ref.								

Energy levels and branching ratios [02Bu29]. Part 3

⁶⁸Zn

E^*	J^π	Branching ratios in percentage										
[keV]		E_f^* : J_f^π :	2417 $\langle 4 \rangle^+$	2510	2750.76 3^-	2821.79 2^+	2955.9	2959.49 $\langle 4^+ \rangle$	3009.27 $\langle 3 \rangle^+$	3184.18 $1, 2^+$	3281.58 4^+	3458.83 5^-
2959.5(1)	$\langle 4^+ \rangle$		11(2)									
3009.27(7)	$\langle 3 \rangle^+$		4.7(5)									
3164.4(14)			100									
3281.58(16)	4^+		83(14)									
3287.1(1)	$1, 2^+$					1.0(2)						
3425.1(2)	$\langle 2-4 \rangle^+$				≤ 25							
3451.0(3)						22(9)						
3458.8(2)	5^-		87(21)					13(4)				
3487.7(15)	$\langle 2-4 \rangle^+$				100							
3496.1(1)	$3^+, 4^+$				2.9(14)							
3586.6(1)	4^+				68(13)							
3610.8(6)	$\langle 6 \rangle^-$											100
3630.3(1)	$\langle 2^+ \rangle$		10(1)		42(5)			18(2)			1.5(3)	
3687.5(5)	$\langle 6^+ \rangle$		100									
3725.8(2)					7(2)	6(2)						
3732.4(10)				100								
3849.3(2)	4^+		88(7)									
3895.8(2)	4^+		77(6)					17(4)				
3911.0(2)	X^-		39(5)								12(3)	
3935.1(2)	3^+				9(2)	7.1(9)						
3970.7(12)	X^+					24(10)	76(34)					
4027.7(4)	$\langle 2^+ \rangle$				19(8)				11(3)			
4284.0(4)	$\langle 1, 2^+ \rangle$				25(5)				13(5)			
4408.4(4)								12(3)				
4512.2(3)	$\langle 2^+ \rangle$		39(5)									
4520.6(4)	$1, 2^+$					15(4)						
4724.1(5)	1^+-3^+					38(10)						
4732.8(11)	$1, 2^+$								19(4)			
4873(4)	2^--4^-				[100]							
4951.5(4)	1^--3^-									18(3)		
5146(5)			< 3									
5187.7(7)			76(22)									
5283.4(6)			49(15)									
5298.0(4)	$1^-, 2^+$				34(10)							
5400.4(5)			67(20)					33(7)				
5565.0(8)			25(8)		28(9)							
5693.8(6)			100									
7362.3(5)	1^-					x						

Energy levels and branching ratios [02Bu29]. Part 4

⁶⁸₃₀Zn

E^*	J^π	Branching ratios in percentage									
[keV]	E_f^* : J_f^π :	3610.8 $\langle 6 \rangle^-$	3664.7 $\langle 1,2 \rangle^+$	3687.5 $\langle 6^+ \rangle$	3935.08 3^+	3942.9 $\langle 8^- \rangle$	4865.9 $\langle 10^- \rangle$	0+X $J \approx \langle 17 \rangle$	1506+X $J+2$	3223+X $J+4$	5141+X $J+6$
3942.9(8)	$\langle 8^- \rangle$	100									
4396.8(7)	$\langle 8^+ \rangle$			100							
4851.2(6)	$2^-, 3^-$		13(5)		7(3)						
4865.9(8)	$\langle 10^- \rangle$					100					
5990.7(9)	$\langle 12^- \rangle$						100				
1506.0+X	$J+2$							x			
3223.0+X	$J+4$								x		
5141.1+X	$J+6$									x	
7262.1+X	$J+8$										x

Energy levels and branching ratios [02Bu29]. Part 5

⁶⁸₃₀Zn

E^* [keV]	J^π	Branching ratios in percentage				
		E_f^* : J_f^π :	7262+X $J+8$	9593+X $J+10$	12148+X $J+12$	14943+X $J+14$
9593.1+X	$J+10$		x			
12148.2+X	$J+12$			x		
14943+X	$J+14$				x	
18016+X	$J+16$					x

Energy levels and branching ratios [00Bh05].

⁶⁹₃₀Zn

E^* [keV]	$2J^\pi$	L	σ (t,p) $\mu\text{b/sr}$	L	S' (d,p)	L	S' (d,p)	σ (d,p) $\mu\text{b/sr}$	σ (d,p) $\mu\text{b/sr}$	L	C^2S (p,d)	σ (p,d) $\mu\text{b/sr}$	L	C^2S (τ, α)	Ref.
0	1^-	2	17	1	1.18	1	1.10	4100	7380	1	0.8	3780	1	1.0**	67Vo05
438.64(2)	9^+	$\langle 5 \rangle$	3	4	7.52	4	9.0	1200	2560	4	1.6	500	4	2.0	67Vo05
531.3(1)	5^-	0	3090	3	1.69	3	1.17	420	860	3	3.5	870	3	3.4	67Vo05
834.5(1)	$\langle 3 \rangle^-$			1	0.58	1	0.53	2200	7400	1	1.9	7060	1	1.9,2.4	67Vo05
872(5)	$\langle 5 \rangle^+$					2	0.99	2500	incl						67Vo05
967(10)															
1007.7(1)	$1^-, 3^-$	2	11												72Hu06
1136(10)															
1180.7(1)	5^-	0	85									240	3	0.51	73DaXY
1224(10)															
1251.7(1)	$1, 3$														
1338(10)															
1409(10)			17												72Hu06
1429.5(2)	$1^- - 5^-$														

(continued)

⁶⁹₃₀Zn

E^*	$2J^\pi$	L	σ (t,p)	L	S'	L	S'	σ (d,p)	σ (d,p)	L	C^2S	σ (p,d)	L	C^2S	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$	(d,p)	(d,p)		(d,p)	$\mu\text{b/sr}$	$\mu\text{b/sr}$		(p,d)	$\mu\text{b/sr}$		(τ, α)	
1458.3(5)	5^-	2	38										3	0.63	73DaXY
1595	$1^-, 3^-$									1	0.27	640			66Mc15
1633.2(6)	$\langle 5^+ \rangle$		10	2	0.48	2	0.61	1800							67Vo05
1696(10)	1^+			0	0.33	0	0.21	6300	7560						67Vo05
1761(10)															
1791(10)	X^-	2	41												72Hu06
1828.0(2)	3^-	2	15	$\langle 1 \rangle$	0.05	1	0.05	250		1	0.27	570			67Vo05
1850(20)													3	0.7,0.5	73DaXY
1893.4(5)	X^-	2	17												72Hu06
1941(10)								≈ 150							67Vo05
1968(10)	$1^-, 3^-$					1	0.03	150		1	0.33	630	$\langle 1 \rangle$		67Vo05
1983(1)	$1^-, 3^-$		6												72Hu06
2032.8(3)	5^-	0	107												72Hu06
2054.3	$1, 3, 5^+$														
2085(10)	5^-	0	36												72Hu06
2210(10)			5												72Hu06
2262(10)	1^+		20	0	0.06	0	0.03	1000	1140						67Vo05
2293(10)	$1^-, 3^-$							≈ 150		1	0.18	290	$\langle 1 \rangle$		66Mc15
2343.8	$1, 3, 5^+$														
2377.1	$1, 3, 5^+$														
2400(10)	5^+			2	0.39	2	0.43	1500	4000						67Vo05
2420(20)	$5^-, 7^-$												3	0.3,0.2	73DaXY
2460(30)	$1^-, 3^-$									1	0.16	240			66Mc15
2504(10)	$1^-, 3^-$					1									67Vo05
2554(10)*	$3^+, 5^+$					2	$\langle 0.1 \rangle$	350							67Vo05
2580(10)*	$\langle 1^-, 3^- \rangle$					$\langle 1 \rangle$	0.1	500							67Vo05
2607(10)															
2625(10)															
2663(10)	1^+			0	0.21	0	0.16	4800	1260						67Vo05
2700(20)	$5^-, 7^-$												3	0.3,0.2	73DaXY
2740(10)	$\langle 3^+, 5^+ \rangle$					$\langle 2 \rangle$	0.03	≈ 100							67Vo05
2790(30)	$1^-, 3^-$									1	0.21	270			66Mc15
2828(10)	1^+			0	0.03	0	0.03	1000							67Vo05
2905(10)	$3^+, 5^+$					2	0.18	730							67Vo05
2919(10)	$1^-, 3^-$					1									67Vo05
2950(10)*	$3^+, 5^+$			2	0.34	2	0.10	640							67Vo05
3014(10)	5^+			2	0.44	2	0.50	2000	4320						67Vo05
3061(10)*	1^+					0	0.03	1000							67Vo05
3091(10)															
3120(10)															
3134(10)															
3194(10)*	$\langle 3^+, 5^+ \rangle$					$\langle 2 \rangle$	0.03	180							67Vo05
3352(10)*								180							67Vo05
3385(10)	1^+			0	0.27	0	0.15	4200	11000						67Vo05
3438(10)	$\langle 1^+ \rangle$					$\langle 0 \rangle$	0.02	600							67Vo05

(continued)

⁶⁹Zn
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E^*	$2J^\pi$	L	σ (t,p)	L	S'	L	S'	σ (d,p)	σ (d,p)	L	C^2S	σ (p,d)	C^2S	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$	(d,p)	(d,p)		(d,p)	$\mu\text{b/sr}$	$\mu\text{b/sr}$		(p,d)	$\mu\text{b/sr}$	(τ, α)	
3457(10)*	$3^+, 5^+$					$\langle 2 \rangle$	$\langle 0.3 \rangle$	1100						67Vo05
3671(10)						[2]			7560					63Li06
3913(10)														
3966	1^+			0	0.27						5220			81Bi06
4089(10)						[0]					5960			63Li06
4193(10)	$\langle 1^-, 3^- \rangle$										4320			73DaXY
4262(10)						[0]					4100			63Li06
4518(10)														
4620(10)														
4661(10)														
4722(10)														
		72Hu06	72Hu06			81Bi06		67Vo05	67Vo05	63Li06		66Mc15	66Mc15	73DaXY Ref.

* Unresolved doublet with probable parameters $L=(1)+(2)$ and $S_N=(0.03+0.04)$ [67Vo05].

** Data are from [00Bh05], see comments therein.

Energy levels and branching ratios [00Bh05]. Part 2

⁶⁹Zn
₃₀

E^*	$2J^\pi$	$T_{1/2}$ or	Ref.	Branching ratios in percentage					
				E_f^* :	0	439	531	834	872
[keV]		Γ_{cm}		$2J_f^\pi$:	1^-	9^+	5^-	$\langle 3 \rangle^-$	$\langle 5 \rangle^+$
0	1^-	56.4(9) m	67Vo05						
438.64(2)	9^+	13.76(2) h	67Vo05		100				
531.3(1)	5^-		67Vo05		100				
834.5(1)	$\langle 3 \rangle^-$		67Vo05		100				
872(5)	$\langle 5 \rangle^+$		67Vo05			100			
967(10)									
1007.7(1)	$1^-, 3^-$		72Hu06		98(3)		0.8(1)	1.1(1)	
1136(10)									
1180.7(1)	5^-		73DaXY		51(2)		46(3)	2.1(5)	1.0
1224(10)									
1251.7(1)	$1, 3$				72(4)			28(4)	
1338(10)									
1409(10)			72Hu06						
1429.5(2)	$1^- - 5^-$				50(1)		9	38(1)	2.0(3)
1458.3(5)	5^-		73DaXY		100				
1595	$1^-, 3^-$		66Mc15		58			42	
1633.2(6)	$\langle 5^+ \rangle$		67Vo05		100				
1696(10)	1^+		67Vo05						
1761(10)									
1791(10)	X^-		72Hu06						
1828.0(2)	3^-		67Vo05		14(1)		12(1)	62(4)	5(2)
1850(20)			73DaXY						

(continued)

⁶⁹Zn
₃₀

E^*	$2J^\pi$	$T_{1/2}$ or	Ref.	Branching ratios in percentage						
[keV]		Γ_{cm}		$E_f^*:$ $2J_f^\pi:$	0 1 [−]	439 9 ⁺	531 5 [−]	834 ⟨3⟩ [−]	872 ⟨5⟩ ⁺	1008 1 [−] ,3 [−]
1893.4(5)	X [−]		72Hu06		29(11)		71(11)			
1941(10)			67Vo05							
1968(10)	1 [−] ,3 [−]		67Vo05							
1983(1)	1 [−] ,3 [−]		72Hu06				100			
2032.8(3)	5 [−]		72Hu06		9(2)		61(5)			
2054.3	1,3,5 ⁺							25	75	
2085(10)	5 [−]		72Hu06							
2210(10)			72Hu06							
2262(10)	1 ⁺		67Vo05							
2293(10)	1 [−] ,3 [−]		66Mc15							
2343.8	1,3,5 ⁺				69		31			
2377.1	1,3,5 ⁺				100					
2400(10)	5 ⁺		67Vo05							
2420(20)	5 [−] ,7 [−]		73DaXY							
2460(30)	1 [−] ,3 [−]		66Mc15							
2504(10)	1 [−] ,3 [−]		67Vo05							
2554(10)*	3 ⁺ ,5 ⁺		67Vo05							
2580(10)*	⟨1 [−] ,3 [−] ⟩		67Vo05							
2607(10)										
2625(10)										
2663(10)	1 ⁺		67Vo05							
2700(20)	5 [−] ,7 [−]		73DaXY							
2740(10)	⟨3 ⁺ ,5 ⁺ ⟩		67Vo05							
2790(30)	1 [−] ,3 [−]		66Mc15							
2828(10)	1 ⁺		67Vo05							
2905(10)	3 ⁺ ,5 ⁺		67Vo05							
2919(10)	1 [−] ,3 [−]		67Vo05							
2950(10)*	3 ⁺ ,5 ⁺		67Vo05							
3014(10)	5 ⁺		67Vo05							
3061(10)*	1 ⁺		67Vo05							
3091(10)										
3120(10)										
3134(10)										
3194(10)*	⟨3 ⁺ ,5 ⁺ ⟩		67Vo05							
3352(10)*			67Vo05							
3385(10)	1 ⁺		67Vo05							
3438(10)	⟨1 ⁺ ⟩		67Vo05							
3457(10)*	3 ⁺ ,5 ⁺		67Vo05							
3671(10)			63Li06							
3913(10)										
3966	1 ⁺		81Bi06							
4089(10)			63Li06							
4193(10)	⟨1 [−] ,3 [−] ⟩		73DaXY							
4262(10)			63Li06							
4518(10)										

(continued)

 $^{69}_{30}\text{Zn}$

E^*	$2J^\pi$	$T_{1/2}$ or	Ref.	E_f^* :	0	Branching ratios in percentage				
[keV]		Γ_{cm}		$2J_f^\pi$:	1^-	439	531	834	872	1008
4620(10)						9^+	5^-	$\langle 3 \rangle^-$	$\langle 5 \rangle^+$	$1^-, 3^-$
4661(10)										
4722(10)										
			Ref.							

Energy levels and branching ratios [00Bh05]. Part 3

 $^{69}_{30}\text{Zn}$

E^*	$2J^\pi$	E_f^* :	Branching ratios in percentage	
[keV]		$2J_f^\pi$:	1181	1252
1429.5(2)	$1^- - 5^-$		5^-	1,3
1828.0(2)	3^-		6(1)	
2032.8(3)	5^-		30(5)	

Energy levels and branching ratios [93Bh01].

 $^{70}_{30}\text{Zn}$

E^*	J^π	L	σ (t,p)	L	$\beta_L R$	L	$C^2 S$	$T_{1/2}$ or	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$		(α, α')		(d, τ)	Γ_{cm}	
0.0	0^+		4380			1	0.5	$> 5 \cdot 10^{14}$ yr	77Ro22
884.8(1)	2^+		164	2	1.09(6)	1+3	0.21+0.13	2.9(3) ps	71Al18
1068.3(2)	0^+		164			1	0.11	3.90(20) ns	77Ro22
1554(5)									
1759.1(1)	$\langle 2 \rangle^+$		5			1	0.25	0.24(+24-12) ps	77Ro22
1786.5(1)	4^+		28			3	0.1		77Ro22
1957.7(2)	2^+		76			1	1.4		77Ro22
2140.4(2)	0^+		76			1	0.011		77Ro22
2375(5)	$\langle 2 \rangle^+$								
2538.0(1)	2^+					1+3		0.21(+28-8) ps	77Ro22
2665(5)	2^+		70			1	0.096		77Ro22
2693.6(2)	4^+		6					0.3(+5-1) ps	72Hu06
2805(5)									
2859.2(2)	3^-		59	3	0.92(5)				71Al18
2949.6(2)	$1^+ - 3^+$					1	0.024	0.04(+2-1) ps	77Ro22
2975(5)	4^+		46						72Hu06
3038.4(2)	4^-		60			[1]	0.055		77Ro22
3222.3(1)	1								
3235(5)	$\langle 4 \rangle^+$		4						72Hu06
3328(5)	$\langle 0^+ \rangle$		53						72Hu06

(continued)

⁷⁰₃₀Zn

E^*	J^π	L	σ (t,p)	L	$\beta_L R$	L	$C^2 S$	$T_{1/2}$ or	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$		(α, α')		(d, τ)	Γ_{cm}	
3340(10)	3^-		45	3	0.43(3)				71Al18
3419(5)	$\langle 3 \rangle^-$		6						72Hu06
3464(5)	4^+		18						72Hu06
3506(5)	5^-		41			1+3	0.02+0.02		77Ro22
3635(5)	2^+		64			1	0.027		77Ro22
3680(5)	0^+		51			1	0.052		77Ro22
3710.6(6)	2^+		28						72Hu06
3750(5)	$\langle 1^- \rangle$		13						72Hu06
3813(5)			21						72Hu06
3844(5)	1^-		25						72Hu06
3888(5)	$\langle 4 \rangle^+$		18						72Hu06
3914(10)			14						72Hu06
3948(5)	1^-		24						72Hu06
3999(10)	2^+		73						72Hu06
4018(10)	$\langle 4 \rangle^+$		14						72Hu06
4063(10)	4^+		8						72Hu06
4146.3(4)	$1^+ - 3^+$		21						72Hu06
4172(10)	$\langle 5 \rangle^-$			5	0.32(3)				71Al18
4297(10)	2^+		49						72Hu06
4309(10)									
4367(10)	$\langle 4 \rangle^+$								
4444(10)	$\langle 4 \rangle^+$								
		93Bh01	72Hu06		71Al18		77Ro22		Ref.

Additional data on this isotope can be found in [03Ad10, 00Wi18, 87Ja05, 70Co31].

Abundance: 0.62(3) %.Parameters for other assumption on L values are given in [04Tu09].

Energy levels and branching ratios [93Bh01]. Part 2

⁷⁰₃₀Zn

E^*	J^π	Branching ratios in percentage							
[keV]		$E_f^*:$	0.0	884.8	1068	1759	1786	1958	3038
		$J_f^\pi:$	0^+	2^+	0^+	$\langle 2 \rangle^+$	4^+	2^+	4^-
884.8(1)	2^+		100						
1068.3(2)	0^+		x	100					
1759.1(1)	$\langle 2 \rangle^+$		29	71					
1786.5(1)	4^+			100					
1957.7(2)	2^+			100					
2140.4(2)	0^+			65			35		
2538.0(1)	2^+		10	50		29	11		
2693.6(2)	4^+			71		21		8	
2859.2(2)	3^-			43		38	19		
2949.6(2)	$1^+ - 3^+$			58		42			

(continued)

⁷⁰₃₀Zn

E^*	J^π	E_f^* :	0.0	884.8	Branching ratios in percentage				
[keV]		J_f^π :	0^+	2^+	1068	1759	1786	1958	3038
					0^+	$\langle 2 \rangle^+$	4^+	2^+	4^-
3038.4(2)	4^-			62			38(3)		
3222.3(1)	1		75		25				
3710.6(6)	2^+					100			
4146.3(4)	1^+-3^+								100

Energy levels and branching ratios [93Bh02].

⁷¹₃₀Zn

E^*	$2J^\pi$	L	S'	σ (d,p)	$T_{1/2}$ or	Ref.	Branching ratios in percentage				
[keV]			(d,p)	$\mu\text{b/sr}$	Γ_{cm}		E_f^* :	0.0	157.7	489.8	675
							$2J_f^\pi$:	1^-	9^+	$1^-, 3^-$	$\langle 3 \rangle^-$
0.0	1^-	1	0.95	3800	2.45(10) m	67Vo05					
157.7(13)	9^+	4	5.8	800	3.96(5) h	67Vo05					
286.3(14)	$\langle 5 \rangle^+$	2	0.19	450		67Vo05			100		
465(5)	$5^-, 7^-$	3	0.76	300		67Vo05					
489.8(3)	$1^-, 3^-$	1	0.08	340		67Vo05		100			
674.7(3)	$\langle 3 \rangle^-$	1	0.23	1000		67Vo05		83(8)		17(5)	
853(5)	$\langle 5 \rangle^+$	2	0.42	1100		67Vo05					
1052(10)				≈ 200		67Vo05					
1078(10)				≈ 150		67Vo05					
1261(1)	$\langle 5 \rangle^+$	2	0.08	240		67Vo05					100
1421(10)	$\langle 3 \rangle^-$	1	0.09	430		67Vo05					
1629(10)	1^+	0	0.29	6400		67Vo05					
1661(10)	$\langle 5 \rangle^+$	2	0.86	2800		67Vo05					
1742(10)				≈ 90		67Vo05					
1791(1)	$\langle 1-5^- \rangle$			≈ 120		67Vo05		100			
1856(1)	$3^+, 5^+$	$\langle 2 \rangle$	$\langle 0.03 \rangle$	≈ 110		67Vo05					100
2179(1)	$\langle 5 \rangle^+$	2	0.23	900		67Vo05			26(18)		74(20)
2377(1)	1^+	0	0.24	5700		67Vo05					
2417(10)	$3^+, 5^+$	2	0.09	340		67Vo05					
2523(10)	$3^+, 5^+$	2	0.32	1300		67Vo05					
2538(10)	$3^+, 5^+$	$\langle 2 \rangle$	$\langle 0.1 \rangle$	500		67Vo05					
2612(10)	$3^+, 5^+$	2	0.1	390		67Vo05					
2713(10)	$3^+, 5^+$	2	0.05	220		67Vo05					
2752(10)	$3^+, 5^+$	2	0.24	1000		67Vo05					
3039(10)	$3^+, 5^+$	2	0.20	900		67Vo05					
3098(10)	$3^+, 5^+$	2	0.09	440		67Vo05					
3178(10)	$3^+, 5^+$	2	0.20	900		67Vo05					
3350(10)	$\langle 1^+ \rangle$	0	0.03	660		67Vo05					
3412(10)	$3^+, 5^+$	2	0.08	410		67Vo05					
3498(10)	$\langle 1^+ \rangle$	0	0.09	1890		67Vo05					
3626(10)	$3^+, 5^+$	2	0.21	1100		67Vo05					
3654(10)				≈ 500		67Vo05					

(continued)

⁷¹₃₀Zn

E^*	$2J^\pi$	L	S'	σ (d,p)	$T_{1/2}$ or	Ref.	Branching ratios in percentage					
[keV]			(d,p)	$\mu\text{b/sr}$	Γ_{cm}		E_{f}^* : $2J_{\text{f}}^\pi$:	0.0 1 ⁻	157.7 9 ⁺	489.8 1 ⁻ ,3 ⁻	675 $\langle 3 \rangle^-$	1261 $\langle 5 \rangle^+$
3746(10)				250		67Vo05						
3765(10)				400		67Vo05						
3779(10)				770		67Vo05						
3842(10)				560		67Vo05						
3860(10)				620		67Vo05						
3890(10)				750		67Vo05						
3926(10)				350		67Vo05						
			67Vo05	67Vo05		Ref.						

Energy levels and branching ratios [93Bh02]. Part 2

⁷¹₃₀Zn

E^*	$2J^\pi$	Branching ratios in percentage				
[keV]		E_f^* : $2J_f^\pi$:	1856 $\langle 3^+, 5^+ \rangle$			2179 $\langle 5 \rangle^+$
2377(1)	1 ⁺		29(11)			71(8)

Energy levels and branching ratios [89Ki02].

⁷²₃₀Zn

E^*	J^π	L	σ (t,p)	$T_{1/2}$ or	Ref.	Branching ratios in percentage					
[keV]		(t,p)	$\mu\text{b/sr}$	Γ_{cm}		E_{f}^* : J_{f}^π :	0 0 ⁺	652.5 2 ⁺	1499 0 ⁺	1657 2 ⁺	2192
0	0 ⁺	0	4420	46.5(1) h	72Hu06						
652.5(3)	2 ⁺	2	140		72Hu06	100					
1499.1(4)	0 ⁺	0	506		72Hu06		100				
1657.4(3)	2 ⁺	2	35		72Hu06	46(3)	54(3)				
2191.8(4)							92(7)			8(2)	
2476(10)	0 ⁺	0	49		72Hu06						
2645.9(5)							68(5)	14(3)		18(3)	
2658(10)	$\langle 4^+ \rangle$	$\langle 4 \rangle$	39		72Hu06						
2909.3(5)			76		72Hu06		45(7)			55(5)	
2978(10)			19		72Hu06						
3049.8(5)			38		72Hu06						100
3094(10)			75		72Hu06						
3154(10)			71		72Hu06						
3661.9(5)								27(4)		27(5)	
3707.6(5)							24(6)	24(7)			24(6)
		89Ki02	72Hu06		Ref.						

Additional data on this isotope can be found in [02Le17, 00Wi18].

Energy levels and branching ratios [89Ki02]. Part 2					⁷² ₃₀ Zn
<i>E</i> [*]	<i>J</i> ^π	<i>E</i> _f [*] : <i>J</i> _f ^π :	Branching ratios in percentage		
[keV]			2645.9	2909.3	3049.8
3661.9(5)			35(4)		12(2)
3707.6(5)				28(4)	