

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 196,17 (2024)	30-Sep-2023

Q(β^-)=-5666.3 20; S(n)=9116.7 16; S(p)=6714.9 16; Q(α)=-3481.5 16 2021Wa16
S(2n)=22007 16, S(2p)=12569.3 16, Q(ϵ)=3366.4 15 (2021Wa16).

Mass measurements: 1921De01.

Additional information 1.

⁶³Zn Levels

Band assignments are from (¹⁶O,2pn γ) (1998Si04).

Cross Reference (XREF) Flags

A	⁶³ Ga $\epsilon+\beta^+$ decay	E	⁵⁴ Fe(¹² C,2pn γ)	I	⁶⁴ Zn(pol p,d),(p,d)
B	⁴⁰ Ca(²⁸ Si,4pn γ)	F	⁶⁰ Ni(α ,n γ)	J	⁶⁴ Zn(pol d,t)
C	⁵⁰ Cr(¹⁶ O,2pn γ)	G	⁶³ Cu(p,n)	K	⁶⁴ Zn(³ He, α)
D	⁵² Cr(¹⁸ O, α 3n γ)	H	⁶³ Cu(p,n γ)		

E(level) [†]	J $\pi^{\ddagger}$	T _{1/2} [#]	XREF	Comments
0.0	3/2 ⁻	38.49 min 5	ABCDEFGHIJK	$\% \epsilon + \% \beta^+ = 100$ $\mu = -0.28143$ 5 (1969La05,2019StZV) $Q = +0.20$ 2 (2017Wr01,2021StZZ) J^π : spin from optical-double resonance (1969La05,1976Fu06) and collinear laser spectroscopy (2017Wr01); $\pi = -$ based on L(p,d)=1 from 0 ⁺ . T _{1/2} : weighted average of 38.71 min 80 (2021Ha10), 38.84 min 15 (2015BoZY), 38.1 min 8 (2000Le02), 38.47 min 5 (1982Gr10), 38.5 min 1 (1969Bo15), and 38.4 min 1 (1968Go10). Others: 38.0 min 1 (1974Co16) and 37.9 min 2 (1969Bo11) are outliers. Weighted average of all values is 38.41 min 8 with a reduced $\chi^2=4.9$ and the unweighted average is 38.37 min 12. μ : from 2019StZV evaluation based on -0.28156 5 measured using optical-double resonance in 1969La05. Other: -0.282 1 from hyperfine structure by collinear laser spectroscopy at ISOLDE-CERN (2017Wr01). Q : from hyperfine structure by collinear laser spectroscopy (2017Wr01). See also 2021StZZ compilation. Other: $+0.29$ 3 from 1969La05 using optical-double resonance. $\delta < r^2 >^{68,63} = -0.389$ 9(stat)43(syst) (2019Xi07). Additional information 2.
192.89 4	5/2 ⁻	0.53 ns 12	ABCDEFGHIJK	J^π : L(pol p,d)=L(pol d,t)=3 from 0 ⁺ ; L-1/2 transfer from analyzing powers. T _{1/2} : from RDM in (α ,n γ). Other: 0.62 ns 21 from gT _{1/2} =0.19 ns 7 and if g=0.30, integral rotation (1977Ni01) in (α ,n γ).
247.86 6	1/2 ⁻	33 ps 8	A FGHIJ	J^π : L(pol p,d)=L(pol d,t)=1 from 0 ⁺ ; L-1/2 from analyzing powers. T _{1/2} : from RDM in (α ,n γ).
627.09 6	1/2 ⁻		A FGHiJ	XREF: i(640). J^π : L(pol d,t)=1 from 0 ⁺ ; L-1/2 transfer from analyzing powers.
637.09 6	3/2 ⁻	>0.53 [@] ps	A C FGHiJK	XREF: i(640). J^π : L(pol p,d)=L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer from analyzing powers.
650.05 5	5/2 ⁻	>0.28 [@] ps	ABCDEFGHIGH J	J^π : L(pol d,t)=3 from 0 ⁺ ; L-1/2 transfer from analyzing powers.
1023.26 6	3/2 ⁻	>1.0 ps	FGHIJ	J^π : L(pol p,d)=L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer from analyzing powers. T _{1/2} : other: >0.35 ps from (p,n γ).
1063.51 8	7/2 ⁻	>0.29 [@] ps	BCDEFgHIJK	XREF: g(1070)k(1065). J^π : 1063.5 γ E2, $\Delta J=2$ to 3/2 ⁻ . L(pol d,t)=3 and 1 from 0 ⁺ for an unresolved

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Adopted Levels, Gammas (continued) ^{63}Zn Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF	Comments
1065.36 13	1/2 ⁻	>0.22 [@] ps	A FgHIJk	doublet and analyzing powers also suggests 7/2 ⁻ for this component and 1/2 ⁻ for the component at E=1065. XREF: g(1070)k(1065). J ^π : L(pol d,t)=3 and 1 from 0 ⁺ for an unresolved doublet and analyzing powers suggests 7/2 ⁻ for the component at E=1063 which agrees with other evidences, and 1/2 ⁻ for this component. This is also supported by L(³ He,α)=3,1 from a doublet. Other: 5/2 from γ(θ) in (p,nγ).
1206.43 7	7/2 ⁻	>0.42 [@] ps	BCDEFGHIJK	J ^π : L(pol p,d)=L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer from analyzing powers.
1284.26 7	5/2 ⁻	>0.40 [@] ps	FGHIJ	J ^π : L(pol d,t)=3 from 0 ⁺ ; L-1/2 transfer from analyzing powers.
1395.37 13	3/2 ⁻	96 fs 24	A FgHIJ	XREF: g(1403). J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer from analyzing powers. T _{1/2} : from τ=139 fs 35, weighted average of 190 fs +80-50 from (p,nγ) and 125 fs 35 from (α,nγ).
1420			g K	XREF: g(1403).
1436.29 11	9/2 ⁻	0.69 ps 21	BCDEFGHIJ	J ^π : 1243.3γ E2, ΔJ=2 to 5/2 ⁻ ; spin=9/2 from γ(θ) in (α,nγ). T _{1/2} : other: >0.30 ps from (p,nγ).
1664.75 13	7/2 ⁻	0.239 ps 62	FGHiJ	XREF: G(1640)i(1680). J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer from analyzing powers. T _{1/2} : from τ=0.345 ps 90, weighted average of 0.370 ps +180-110 from (p,nγ) and 0.335 ps 90 from (α,nγ).
1678.0 2	5/2 ⁻ , 7/2 ⁻		g iJ	XREF: g(1697)i(1680). E(level): from (pol d,t). J ^π : L(pol d,t)=3 from 0 ⁺ .
1691.23 9	5/2 ⁻	71 fs +19-14	A FgH J	XREF: g(1697). J ^π : L(pol d,t)=3 from 0 ⁺ ; L-1/2 transfer from analyzing powers. T _{1/2} : from τ=102 fs +27-20, weighted average of 90 fs +27-20 from (p,nγ) and 120 fs 30 from (α,nγ).
1702.66 6	5/2 ⁻ , 7/2 ⁻		g iJK	XREF: g(1697)i(1680). J ^π : L(pol d,t)=1+3 from 0 ⁺ ; L(³ He,α)=3 from 0 ⁺ .
1703.11 ^{&} 9	9/2 ⁺	32 ps 4	BCDEFgH	XREF: g(1697). J ^π : from γ(θ) and γ(lin pol) in (α,nγ). T _{1/2} : from RDM in (α,nγ). Other: >0.25 ps from (p,nγ).
1860.93 17	9/2 ⁻	0.49 ps 16	F H J	J ^π : 1210.7γ E2, ΔJ=2 to 5/2 ⁻ ; 797.9γ M1+E2 to 7/2 ⁻ . T _{1/2} : τ=0.71 ps 23, weighted average of 0.71 ps 23 from (α,nγ) and 0.48 ps +100-22 from (p,nγ).
1901.48 11	1/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L-1/2 transfer from analyzing powers.
1909.26 13	3/2 ⁻	>0.28 [@] ps	HIJK	XREF: K(1924). J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer from analyzing powers. But J=5/2 from (p,nγ) is in disagreement.
1978.26 19	9/2 ⁻	0.19 [@] ps +7-5	F H J	J ^π : from γ(θ) and γ(lin pol) in (α,nγ). Others: 3/2, 5/2, 7/2 from γ(θ) in (p,nγ) and (9/2 ⁺) from L(pol d,t)=(4) are in disagreement. T _{1/2} : other: <0.28 ps from (α,nγ).
2050.68 11	9/2 ⁻	>0.31 [@] ps	CDEF H J	J ^π : from γ(θ) and γ(lin pol) in (α,nγ).
2157.67 34	3/2 ⁻	0.028 [@] ps +14-10	F HIJK	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer from analyzing powers. T _{1/2} : other: 0.18 ps 5 from (α,nγ) is discrepant, which may stem from 1910γ not being recognized as a doublet by 1979Mu09 in (α,nγ), as stated in 1982Pa01 in (p,nγ).
2213.6 2			J	
2233.35 23	11/2 ⁻	>1.4 ps	F	J ^π : from γ(θ) and γ(lin pol) in (α,nγ).
2236.8 7			J	
2249.14 15	9/2 ⁻	0.17 ps +7-5	F H J	J ^π : 1599.8γ E2, ΔJ=2 to 5/2 ⁻ , 1184.9γ M1+E2 to 7/2 ⁻ . Other:

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Adopted Levels, Gammas (continued) ^{63}Zn Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF	Comments
				5/2,7/2 from $\gamma(\theta)$ in (p,n γ) is in disagreement. T _{1/2} : from $\tau=0.24$ ps +10-7, weighted average of 0.24 ps +10-7 from (p,n γ) and 0.15 ps 4 from (α ,n γ).
2261.52 17	1/2 ⁻	0.07 [@] ps +3-2	H J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L-1/2 transfer from analyzing powers. Other: (3/2) from (p,n γ) is in disagreement.
2288.36 22	7/2 ⁻	>0.21 [@] ps	H J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer from analyzing powers.
2291.43 17	3/2 ⁻	64 [@] fs +26-19	F H	XREF: F(2289.7). J ^π : spin=3/2 from $\gamma(\theta)$ in (α ,n γ) and (p,n γ); 2042.8 γ M1+E2 to 1/2 ⁻ . T _{1/2} : other: 14 fs 7 from (α ,n γ) is discrepant, and it could be for the unresolved doublet of 2288+2291 in (α ,n γ).
2293.00 31	3/2 ⁻	30 [@] fs +15-10	H	J ^π : spin=3/2 from $\gamma(\theta)$ in (p,n γ); 2045.1 γ M1+E2 to 1/2 ⁻ .
2319.12 13	11/2 ⁻	0.35 ps 9	BCD F J	J ^π : from $\gamma(\theta)$ and $\gamma(\text{lin pol})$ in (α ,n γ).
2367.1 5			J	
2378.6 6	9/2	>1.4 ps	F H J	J ^π : from $\gamma(\theta)$ in (α ,n γ). T _{1/2} : other: >0.21 ps from (p,n γ).
2403.31 19	1/2,3/2,5/2	0.11 [@] ps +7-4	H	J ^π : from $\gamma(\theta)$ in (p,n γ).
2403.54 6	7/2 ⁻		J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer from analyzing powers. This level is considered as a different level from the 2403 level in (p,n γ), considering that J ^π =7/2 ⁻ would require E2 for 1380 γ inconsistent with $\gamma(\theta)$ in (p,n γ), and M3 for 1776.4 γ which is not allowed based on RUL.
2462.75 9	3/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
2477.15 12	1/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L-1/2 transfer.
2500.69 14	3/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
2521.20 15	3/2 ⁻		HIJK	J ^π : L(pol p,d)=1 from 0 ⁺ ; 1456.9 γ to 7/2 ⁻ .
2585.17 ^{&} 30	13/2 ⁺	3.54 ps 28	BCDEF	J ^π : from $\gamma(\theta)$ and $\gamma(\text{lin pol})$ in (α ,n γ).
2588.18 16	3/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
2600.07 27	3/2 ⁻		H J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
2609.1 4	1/2 ⁻ ,3/2 ⁻		H J	J ^π : L(d,t)=1 from 0 ⁺ .
2634.91 26	7/2 ⁻	187 fs 52	F HIJK	XREF: i(2640)k(2650). J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
2645.1 6			ijk	XREF: i(2640)k(2650).
2690.9 10	5/2 ⁻		H J	E(level): other: 2692.2 6 from (pol d,t). J ^π : L(pol d,t)=3 from 0 ⁺ ; L-1/2 transfer.
2750.67 34	7/2 ⁻		HIJK	XREF: i(2760)k(2760). E(level): other: 2749.77 10 from (pol d,t). J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
2769.3 2	5/2 ⁻ ,7/2 ⁻		ijk	XREF: i(2760)k(2760). J ^π : L(d,t)=3 from 0 ⁺ .
2781.3 3			J	
2826.72 ^u 28	11/2 ⁺	291 fs 90	CD F	J ^π : from $\gamma(\theta)$ and $\gamma(\text{lin pol})$ in (α ,n γ).
2837.5 2	7/2 ⁻		Jk	XREF: k(2850). J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
2856.0 3			ijk	XREF: i(2850)k(2850).
2869.7 5	(1/2 to 7/2) ⁻		ijk	XREF: i(2850)k(2850). J ^π : L(d,t)=1,3 from 0 ⁺ .
2890.6 5	5/2 ⁻ ,7/2,9/2 ⁺		J	J ^π : L(d,t)=3,4 from 0 ⁺ .
2912.0 5	9/2	>1.4 ps	F J	E(level): other: 2910.3 4 from (pol d,t). J ^π : from $\gamma(\theta)$ in (α ,n γ).
2928.8 5	5/2 ⁻		JK	XREF: K(2940). E(level): from (pol d,t).

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Adopted Levels, Gammas (continued) ^{63}Zn Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF	Comments
2934.4 4	13/2 ⁻	215 fs 62	CD F	J ^π : L(pol d,t)=3 from 0 ⁺ ; L-1/2 transfer from analyzing powers. J ^π : from $\gamma(\theta)$ and $\gamma(\text{lin pol})$ in $(\alpha, n\gamma)$.
2957.2 5	3/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
2976.9 7	1/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L-1/2 transfer.
2993.9 5	3/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
3004.0 5	7/2 ⁻		iJ	XREF: i(3010). J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
3020.3 6	7/2 ⁻		iJK	XREF: i(3010). J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
3047.6 8			J	
3061.7 5			J	
3079.8 8	5/2 ⁻ , 7/2, 9/2 ⁺		J	J ^π : L(pol d,t)=3,4 from 0 ⁺ .
3088.2 6			J	
3108.0 7			J	
3121.1 8			J	
3136.1 6	3/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
3164.9 10			J	
3180.1 17	5/2 ⁻		J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L-1/2 transfer.
3191 3	3/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
3204.5 11			J	
3215.3 8	5/2 ⁻ , 7/2 ⁻		J	J ^π : L(pol d,t)=3 from 0 ⁺ .
3233.8 15			J	
3249.2 11	5/2 ⁻ , 7/2 ⁻		J	J ^π : L(pol d,t)=3 from 0 ⁺ .
3266.5 12	3/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
3292.5 10	7/2 ⁻		J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
3315.3 13	5/2 ⁻		J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L-1/2 transfer.
3340.4 10	3/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
3346.3 9	7/2 ⁻		J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
3357.5 6			D iJk	XREF: i(3380)k(3370). J ^π : 530.8γ to 11/2 ⁺ gives (7/2 ⁺ :15/2 ⁺).
3384.9 14	7/2 ⁻		IJK	XREF: I(3380)K(3370). J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
3398.1 12	3/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
3441.8 12	5/2 ⁻		J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L-1/2 transfer.
3480.9 4	(13/2 ⁺)		BCD	J ^π : 654γ to 11/2 ⁺ , 1178γ to 9/2 ⁺ .
3509.4 11	3/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
3516.5 10	9/2 ⁺		J	J ^π : L(pol d,t)=4 from 0 ⁺ ; L+1/2 transfer.
3527.90 25	13/2 ⁽⁻⁾		CD	J ^π : 1477.3γ Q, ΔJ=2 to 9/2 ⁻ , 1208.9γ D, ΔJ=1 to 11/2 ⁻ .
3559 3			J	
3580.8 14			J	
3612.0 12	7/2 ⁻		J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
3634.9 11	5/2 ⁻ , 7/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ .
3647.7 11	3/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
3668.1 7			J	
3680.2 10	3/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
3688.5 5	7/2 ⁻		J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
3723.7 15			J	
3735.7 11			J	
3749.5 9	9/2 ⁺		J	J ^π : L(pol d,t)=4 from 0 ⁺ ; L+1/2 transfer.
3756.5 10	5/2 ⁻ , 7/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ .
3764.02 ^{&} 32	(17/2) ⁺		BCDEF	J ^π : 1178.8γ E2, ΔJ=2 to 13/2 ⁺ .
3769.89 ^u 30	(15/2 ⁺)		CD	J ^π : 1184.7γ to 13/2 ⁺ , 943.2γ to 11/2 ⁺ .
3781.7 11			J	
3799.1 8	9/2 ⁺		J	J ^π : L(pol d,t)=4 from 0 ⁺ ; L+1/2 transfer.
3829 9			J	

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Adopted Levels, Gammas (continued) ^{63}Zn Levels (continued)

E(level) [†]	J ^π [‡]	XREF	Comments
3836 4	5/2 ⁻ , 7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ .
3844 4		J	
3862 2		J	
3879.8 5	9/2 ⁺	J	J ^π : L(pol d,t)=4 from 0 ⁺ ; L+1/2 transfer.
3890.9 9		B J	Additional information 3.
3899.6 10	5/2 ⁻ , 7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ .
3916.5 15		J	
3923.9 8		J	
3932.4 19		J	
3940.5 15	7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
3960	1/2 ⁻ , 3/2 ⁻	I	J ^π : L(pol p,d)=1 from 0 ⁺ .
3976.8 9	9/2 ⁺	J	J ^π : L(pol d,t)=4 from 0 ⁺ ; L+1/2 transfer.
3997 2		J	
4004 2		J	
4017.9 13	5/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L-1/2 transfer.
4026.0 13	3/2 ⁻	J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
4039 4	7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
4057.6 13	7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
4067 5		J	
4079.6 15		J	
4094.5 14	7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
4111.6 12	3/2 ⁻	JK	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
4121.4 13	7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
4130 2	7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
4152.8 15	5/2 ⁻	J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L-1/2 transfer.
4167 2	5/2 ⁻ , 7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ .
4174.2 18	5/2 ⁻ , 7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ .
4184.1 19	7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
4195 4	5/2 ⁻ , 7/2, 9/2 ⁺	J	J ^π : L(pol d,t)=3, 4 from 0 ⁺ .
4214.1 16	7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
4230.1 19	3/2 ⁻	J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
4245.5 19	7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
4257.3 8		D J	
4265 3	3/2 ⁻	J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
4286.5 19	5/2 ⁻ , 7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ .
4312.1 19	7/2 ⁻	IJK	XREF: I(4320)K(4320).
		J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
4332 2	7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
4355.03 33	(15/2 ⁻)	BCD	J ^π : 1769.8γ (D), ΔJ=(1) to (13/2 ⁺); 590.9γ (D), ΔJ=(1) to (17/2 ⁺); π=(-) from 1561.1γ from 5916, (19/2 ⁻) level. See comments at 5916 level.
4365.5 6		D	
4396 2	5/2 ⁻ , 7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ .
4405 3	1/2 ⁻	J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L-1/2 transfer.
4415 3	1/2 ⁻	J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L-1/2 transfer.
4427 2	1/2 ⁻	J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L-1/2 transfer.
4445 2	1/2 ⁻	J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L-1/2 transfer.
4455 3	5/2 ⁻ , 7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ .
4471 3	3/2 ⁻	J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
4482 3	5/2 ⁻ , 7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ .
4490 3	1/2 ⁻	J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L-1/2 transfer.
4505 3	1/2 ⁻	J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L-1/2 transfer.
4523 3	5/2 ⁻ , 7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ .
4535 3	7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
4546 3	5/2 ⁻ , 7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ .
4558 3	5/2 ⁻ , 7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ .
4569 3	5/2 ⁻ , 7/2 ⁻	J	J ^π : L(pol d,t)=3 from 0 ⁺ .

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{63}Zn Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF	Comments
4585 3	3/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
4602 3	1/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L-1/2 transfer.
4619 3	5/2 ⁻ , 7/2 ⁻		J	J ^π : L(pol d,t)=3 from 0 ⁺ .
4630 4	5/2 ⁻ , 7/2 ⁻		J	J ^π : L(pol d,t)=3 from 0 ⁺ .
4638 3	1/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L-1/2 transfer.
4655 4	5/2 ⁻ , 7/2 ⁻		J	J ^π : L(pol d,t)=3 from 0 ⁺ .
4667 4			J	
4684.2 8			D	
4689 3	5/2 ⁻		J	J ^π : L(pol d,t)=3 from 0 ⁺ ; L-1/2 transfer.
4699 4	1/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L-1/2 transfer.
4707 4	3/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ ; L+1/2 transfer.
4720 4	1/2 ⁻ , 3/2 ⁻		J	J ^π : L(pol d,t)=1 from 0 ⁺ .
4732 5			J	
4745 4			J	
4764 4	5/2 ⁻ , 7/2 ⁻		JK	XREF: K(4770). J ^π : L(pol d,t)=3 from 0 ⁺ .
4776.2 6			D	
4777 4	7/2 ⁻		IJ	XREF: I(4800). J ^π : L(pol d,t)=3 from 0 ⁺ ; L+1/2 transfer.
4904			B	Additional information 4.
5076.3 6			D	
5076.6 ^a 4	(19/2 ⁺)		BCD	J ^π : 1306.7γ Q, ΔJ=2 to (15/2 ⁺), 1312.5 γ to (17/2 ⁺).
x	3/2 ⁻		G	E(level), J ^π : IAS of ^{63}Cu g.s., x≈5300 (1975Wo01) from (p,n).
5320	(1/2 ⁻ , 3/2 ⁻)		I	J ^π : L(pol p,d)=(1) from 0 ⁺ ;
5334.6 6			D	
5346.2 ^{&} 5	(21/2 ⁺)	<280 fs	BCDEF	J ^π : 21/2 ⁺ , 17/2 ⁺ from γ(θ) and γ(lin pol) in (α,nγ); 1582.2γ E2, ΔJ=2 to (17/2 ⁺).
5406.54 34	(17/2 ⁻)		CD	J ^π : 1878.8γ Q, ΔJ=2 to 13/2 ⁽⁻⁾ .
5424.53 32	(17/2 ⁻)		CD	J ^π : 1896.8γ Q, ΔJ=2 to 13/2 ⁽⁻⁾ ; 1660.4γ to (17/2 ⁺).
5490	1/2 ⁻ , 3/2 ⁻		K	J ^π : L($^3\text{He}, \alpha$)=1 from 0 ⁺ .
5916.1 4	(19/2 ⁻)		BCD	J ^π : 1561.1γ to (15/2), 570γ to (21/2 ⁺); 317.6γ (D), ΔJ=(1) from (21/2 ⁻). π=(-) is assigned based on 653.4γ Q, ΔJ=2 from π=-, which in turn determines π=(-) for 4355 level with J=(15/2) fed by 1561.1γ from this level.
x+670	1/2 ⁻		G	E(level), J ^π : IAS of 670, 1/2 ⁻ level in ^{63}Cu (1975Wo01) from (p,n).
6233.75 33	(21/2 ⁻)		BCD	J ^π : 809.2γ Q, ΔJ=2 to (17/2 ⁻), 1157.2γ (D), ΔJ=(1) to (19/2 ⁺).
x+960	5/2 ⁻		G	E(level): IAS of 962, 5/2 ⁻ level in ^{63}Cu (1975Wo01).
6385.6 7			D	
6487.4 ^a 6	(23/2 ⁺)		BCD	J ^π : 1410.8γ Q, ΔJ=2 to (19/2 ⁺).
6569.6 5	(23/2 ⁻)		BCD	J ^π : 1223.4γ E1, ΔJ=1 to (21/2 ⁺); 653.4γ Q, ΔJ=2 to (19/2), 5916 level. This also determines π=(-) for 5916 level.
x+1330	7/2 ⁻		G	E(level): IAS of 1327, 7/2 ⁻ level in ^{63}Cu (1975Wo01).
6640	5/2 ⁻ , 7/2 ⁻		I	J ^π : L(p,d)=3 from 0 ⁺ .
6830	5/2 ⁻ , 7/2 ⁻		K	J ^π : L($^3\text{He}, \alpha$)=3 from 0 ⁺ .
7160	5/2 ⁻ , 7/2 ⁻		I	J ^π : L(p,d)=3 from 0 ⁺ .
7320	5/2 ⁻ , 7/2 ⁻		K	J ^π : L($^3\text{He}, \alpha$)=3 from 0 ⁺ .
7524.6 9			D	
7610.4 5	(25/2 ⁻)		CD	J ^π : 1376.6γ Q, ΔJ=2 to (21/2 ⁻).
7926.1 6	(27/2 ⁻)		BCD	J ^π : 1356.1γ Q, ΔJ=2 to (23/2 ⁻).
9095.9 6	(29/2 ⁻)		CD	J ^π : 1485.5γ (Q), ΔJ=(2) to (25/2 ⁻).
9773.4 7	(31/2 ⁻)		CD	J ^π : 1847.3γ to (27/2 ⁻); (31/2 ⁻) proposed in ($^{16}\text{O}, 2\text{pn}\gamma$) and ($^{18}\text{O}, \alpha 3\text{n}\gamma$).
11048.4 8			D	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

 ^{63}Zn Levels (continued)

[†] From a least-squares fit to γ -ray energies with uncertainties for level connected with those γ transitions, and from transfer reactions for other levels, unless otherwise noted.

[‡] For levels populated in high-spin datasets, it is assumed spin ascends as excitation energy increases.

From DSAM in $(\alpha, n\gamma)$, unless otherwise noted.

@ From DSAM in $(p, n\gamma)$.

& Band(A): Band based on 1703, $9/2^+$ level. Proposed configuration= $\nu g 9/2$ coupled to quadrupole phonon of even-even core.

^a Band(B): Band based on 2827, $11/2^+$ level.

Adopted Levels, Gammas (continued)

$\gamma(^{63}\text{Zn})$

Additional information 5.

$E_i(\text{level})$	J_i^π	$E_\gamma^{\ddagger}$	$I_\gamma^{\ddagger}$	E_f	J_f^π	Mult. [#]	$\delta^{\#}$	$\alpha^{\dagger}$	Comments
192.89	5/2 ⁻	192.93 6	100	0.0	3/2 ⁻	M1+E2	-0.06 3	0.01111 25	B(M1)(W.u.)=0.0057 +17-11; B(E2)(W.u.)=1.0 +13-7 $\alpha(K)$ =0.00993 22; $\alpha(L)$ =0.001022 24; $\alpha(M)$ =0.0001466 34 $\alpha(N)$ =5.79×10 ⁻⁶ 12 E_γ : weighted average of 193.0 2 from ⁶³ Ga $\varepsilon+\beta^+$ decay, 192.9 1 from (¹⁸ O, α 3n γ), 192.9 1 from (α ,n γ), and 192.94 6 from (p,n γ). Mult.: also supported by ce data in (p,n γ) (1967Me18); ΔJ =1 from $\gamma\gamma$ (DCO) in (¹⁸ O, α 3n γ). δ : weighted average of -0.08 +3-4 (1982Pa01), -0.07 3 (1968Bi03), 0.4 1 (1967Me18), 0.3 2 (1978Me17) in (p,n γ), and -0.03 2 (1978Me17), -0.07 3 (1968Bi03) in (α ,n γ). Other: +0.07 3 (1978Mu02) in (α ,n γ) has opposite sign; -2.5 +2-3 (1982Pa01).
247.86	1/2 ⁻	248.05 18	100	0.0	3/2 ⁻	(M1+E2)		0.014 8	$\alpha(K)$ =0.012 7; $\alpha(L)$ =0.0013 8; $\alpha(M)$ =1.9×10 ⁻⁴ 11 $\alpha(N)$ =7.E-6 4 E_γ : unweighted average of 247.9 2 from ⁶³ Ga $\varepsilon+\beta^+$ decay, 248.4 1 from (α ,n γ), and 247.84 7 from (p,n γ). Mult.: D+Q from $\gamma(\theta)$ in (p,n γ); $\Delta\pi$ =no from level scheme. B(M1)(W.u.)=0.044 +14-9 if M1; pure E2 is ruled out since it would require BE2W=1.2×10 ³ +4-3 exceeding RUL=300.
627.09	1/2 ⁻	627.07 7	100	0.0	3/2 ⁻	D+Q			E_γ : weighted average of 627.1 2 from ⁶³ Ga $\varepsilon+\beta^+$ decay, 627.0 1 from (α ,n γ), and 627.10 7 from (p,n γ).
637.09	3/2 ⁻	389.29 9	4.3 4	247.86	1/2 ⁻	M1+E2	-0.05 +3-4	1.98×10 ⁻³ 3	B(M1)(W.u.)<0.032; B(E2)(W.u.)<2.9 $\alpha(K)$ =0.001772 28; $\alpha(L)$ =0.0001793 28; $\alpha(M)$ =2.57×10 ⁻⁵ 4 $\alpha(N)$ =1.030×10 ⁻⁶ 16 E_γ : weighted average of 389.8 7 from ⁶³ Ga $\varepsilon+\beta^+$ decay, 389.4 2 from (α ,n γ), and 389.26 9 from (p,n γ). I_γ : weighted average of 3.4 17 from ⁶³ Ga $\varepsilon+\beta^+$ decay, 4.4 4 from (α ,n γ), and 4.2 4 from (p,n γ). B(M1)(W.u.)<0.16; B(E2)(W.u.)<2.4 $\alpha(K)$ =0.000580 8; $\alpha(L)$ =5.82×10 ⁻⁵ 8; $\alpha(M)$ =8.34×10 ⁻⁶ 12 $\alpha(N)$ =3.36×10 ⁻⁷ 5 E_γ : weighted average of 637.0 2 from ⁶³ Ga $\varepsilon+\beta^+$ decay, 637.1 1 from (α ,n γ), and 637.04 7 from (p,n γ). I_γ : from (α ,n γ) and (p,n γ). δ : other: -0.09 18 from (p,n γ).
		637.06 7	100.0 4	0.0	3/2 ⁻	M1+E2	+0.04 2	0.000647 9	

Adopted Levels, Gammas (continued)

$\gamma(^{63}\text{Zn})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^\ddagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. [#]	$\delta^\#$	$\alpha^\dagger$	Comments
650.05	5/2 ⁻	457.25 7	14.8 12	192.89	5/2 ⁻	M1+E2	-0.08 +1-2	1.37×10 ⁻³ 2	B(M1)(W.u.)<0.11; B(E2)(W.u.)<9.4 $\alpha(\text{K})=0.001225$ 18; $\alpha(\text{L})=0.0001236$ 18; $\alpha(\text{M})=1.772\times 10^{-5}$ 26 $\alpha(\text{N})=7.11\times 10^{-7}$ 10 E_γ : weighted average of 457.9 6 from ⁶³ Ga $\varepsilon+\beta^+$ decay, 456.9 5 from (¹⁸ O, α 3n γ), 457.4 1 from (α ,n γ), and 457.19 6 from (p,n γ). I_γ : unweighted average of 12.3 32 from ⁶³ Ga $\varepsilon+\beta^+$ decay, 17.3 8 from (¹⁶ O,2pn γ), 11.6 4 from (¹⁸ O, α 3n γ), 17.1 14 from (α ,n γ), and 15.5 11 from (p,n γ). δ : other: +0.07 6 or 1.5 +3-2 from (p,n γ). B(M1)(W.u.)<0.2; B(E2)(W.u.)<273 $\alpha(\text{K})=0.0006180$ 99; $\alpha(\text{L})=6.22\times 10^{-5}$ 10; $\alpha(\text{M})=8.91\times 10^{-6}$ 15 $\alpha(\text{N})=3.57\times 10^{-7}$ 6 E_γ : unweighted average of 650.0 2 from ⁶³ Ga $\varepsilon+\beta^+$ decay, 649.9 1 from (¹⁸ O, α 3n γ), 650.2 1 from (α ,n γ), and 650.14 6 from (p,n γ). I_γ : others: 100 6 from ⁶³ Ga $\varepsilon+\beta^+$ decay, 100 5 from (¹⁶ O,2pn γ), 100 4 from (¹⁸ O, α 3n γ), and 100.0 14 from (α ,n γ). δ : other: -0.75 18 from (p,n γ). B(M1)(W.u.)<0.11 $\alpha(\text{K})=0.00302$ 9; $\alpha(\text{L})=0.000310$ 9; $\alpha(\text{M})=4.43\times 10^{-5}$ 13 $\alpha(\text{N})=1.72\times 10^{-6}$ 5 ; pure E2 is ruled out since it would require BE2W=1.2×10 ³ +4-3 exceeding RUL=300. E_γ : unweighted average of 373.5 1 from (α ,n γ) and 373.06 8 from (p,n γ). I_γ : from (α ,n γ) and (p,n γ). Mult.: D+Q from $\gamma(\theta)$; $\Delta\pi$ =no from level scheme. δ : others: -0.3 +2-3 or 1.7 +6-8 from (p,n γ). B(M1)(W.u.)<0.019; B(E2)(W.u.)<77 $\alpha(\text{K})=0.00221$ 9; $\alpha(\text{L})=0.000225$ 9; $\alpha(\text{M})=3.22\times 10^{-5}$ 13 $\alpha(\text{N})=1.27\times 10^{-6}$ 5 E_γ : other: 396.2 1 from (α ,n γ). I_γ : weighted average of 15.9 11 from (α ,n γ) and 16.8 13 from (p,n γ). Mult.: D+Q from $\gamma(\theta)$; $\Delta\pi$ =no from level scheme.
		650.03 9	100.0 11	0.0	3/2 ⁻	M1+E2	-0.57 3	0.000689 11	
1023.26	3/2 ⁻	373.28 22	100 5	650.05	5/2 ⁻	(M1+E2)	-0.82 +4-5	0.00337 10	
		396.1 1	16.3 11	627.09	1/2 ⁻	(M1+E2)	+0.57 +6-3	0.00246 10	

Adopted Levels, Gammas (continued)

$\gamma(^{63}\text{Zn})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\ddagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult.#	$\delta^\#$	$\alpha^\dagger$	Comments
1023.26	3/2 ⁻	775.46 8	72 4	247.86	1/2 ⁻	(M1+E2)	-0.91 +24-6	0.000484 20	B(M1)(W.u.)<0.0097; B(E2)(W.u.)<20 $\alpha(K)=0.000434$ 18; $\alpha(L)=4.36\times 10^{-5}$ 19; $\alpha(M)=6.25\times 10^{-6}$ 27 $\alpha(N)=2.50\times 10^{-7}$ 10 E_γ : weighted average of 775.5 1 from (α ,n γ) and 775.43 8 from (p,n γ). I_γ : weighted average of 74 6 from (α ,n γ) and 71 4 from (p,n γ). Mult.: D+Q from $\gamma(\theta)$; $\Delta\pi$ =no from level scheme. δ : others: +0.00 8 or -1.7 +3-4 from (p,n γ). B(M1)(W.u.)<0.0017; B(E2)(W.u.)<8.8 $\alpha(K)=0.000242$ 4; $\alpha(L)=2.42\times 10^{-5}$ 4; $\alpha(M)=3.47\times 10^{-6}$ 5 $\alpha(N)=1.393\times 10^{-7}$ 21 E_γ : other: 1023.2 2 from (α ,n γ). I_γ : unweighted average of 84 5 from (α ,n γ) and 69.6 34 from (p,n γ). Mult.: D+Q from $\gamma(\theta)$; $\Delta\pi$ =no from level scheme. δ : others: +0.8 +9-7 from (p,n γ); -0.4 2 or -1.5 5 from 1978Me17 in (α ,n γ).
		1023.22 8	77 7	0.0	3/2 ⁻	(M1+E2)	+1.9 2	0.000270 4	$\alpha(K)=0.001548$ 24; $\alpha(L)=0.0001564$ 24; $\alpha(M)=2.244\times 10^{-5}$ 35 $\alpha(N)=8.99\times 10^{-7}$ 14 B(M1)(W.u.)<0.19; B(E2)(W.u.)<23 E_γ : weighted average of 413.3 1 from (¹⁸ O, α 3n γ), 413.5 1 from (α ,n γ), and 413.2 1 from (p,n γ). I_γ : unweighted average of 17.2 8 from (¹⁸ O, α 3n γ), 22.2 19 from (α ,n γ), and 28.2 20 from (p,n γ). Other: 55.8 31 from (¹⁶ O,2pn γ) is greatly discrepant with others. Mult.: D+Q from $\gamma(\theta)$; $\Delta\pi$ =no from level scheme. δ : others: -0.17 3 or -2.5 2 from (p,n γ). $\alpha(K)=0.000313$ 5; $\alpha(L)=3.13\times 10^{-5}$ 5; $\alpha(M)=4.49\times 10^{-6}$ 7 $\alpha(N)=1.809\times 10^{-7}$ 28 B(M1)(W.u.)<0.016; B(E2)(W.u.)<11 E_γ : unweighted average of 870.3 1 from (¹⁸ O, α 3n γ), 870.8 1 from (α ,n γ), and 870.25 10 from (p,n γ). I_γ : unweighted average of 25.6 13 from (¹⁶ O,2pn γ), 22.2 10 from (¹⁸ O, α 3n γ), 14.2 10 from (α ,n γ), and 24.2 14 from (p,n γ). Mult.: from $\gamma\gamma(\text{DCO})$ and $\gamma(\text{lin pol})$ in (¹⁸ O, α 3n γ). δ : others: +0.58 4 or +3.5 3 from (p,n γ).
1063.51	7/2 ⁻	413.3 1	22.5 32	650.05	5/2 ⁻	(M1+E2)	+0.08 3	1.73×10^{-3} 3	$\alpha(K)=0.001548$ 24; $\alpha(L)=0.0001564$ 24; $\alpha(M)=2.244\times 10^{-5}$ 35 $\alpha(N)=8.99\times 10^{-7}$ 14 B(M1)(W.u.)<0.19; B(E2)(W.u.)<23 E_γ : weighted average of 413.3 1 from (¹⁸ O, α 3n γ), 413.5 1 from (α ,n γ), and 413.2 1 from (p,n γ). I_γ : unweighted average of 17.2 8 from (¹⁸ O, α 3n γ), 22.2 19 from (α ,n γ), and 28.2 20 from (p,n γ). Other: 55.8 31 from (¹⁶ O,2pn γ) is greatly discrepant with others. Mult.: D+Q from $\gamma(\theta)$; $\Delta\pi$ =no from level scheme. δ : others: -0.17 3 or -2.5 2 from (p,n γ). $\alpha(K)=0.000313$ 5; $\alpha(L)=3.13\times 10^{-5}$ 5; $\alpha(M)=4.49\times 10^{-6}$ 7 $\alpha(N)=1.809\times 10^{-7}$ 28 B(M1)(W.u.)<0.016; B(E2)(W.u.)<11 E_γ : unweighted average of 870.3 1 from (¹⁸ O, α 3n γ), 870.8 1 from (α ,n γ), and 870.25 10 from (p,n γ). I_γ : unweighted average of 25.6 13 from (¹⁶ O,2pn γ), 22.2 10 from (¹⁸ O, α 3n γ), 14.2 10 from (α ,n γ), and 24.2 14 from (p,n γ). Mult.: from $\gamma\gamma(\text{DCO})$ and $\gamma(\text{lin pol})$ in (¹⁸ O, α 3n γ). δ : others: +0.58 4 or +3.5 3 from (p,n γ).
		870.45 18	21.6 26	192.89	5/2 ⁻	M1+E2	-0.51 5	0.000349 6	$\alpha(K)=0.000313$ 5; $\alpha(L)=3.13\times 10^{-5}$ 5; $\alpha(M)=4.49\times 10^{-6}$ 7 $\alpha(N)=1.809\times 10^{-7}$ 28 B(M1)(W.u.)<0.016; B(E2)(W.u.)<11 E_γ : unweighted average of 870.3 1 from (¹⁸ O, α 3n γ), 870.8 1 from (α ,n γ), and 870.25 10 from (p,n γ). I_γ : unweighted average of 25.6 13 from (¹⁶ O,2pn γ), 22.2 10 from (¹⁸ O, α 3n γ), 14.2 10 from (α ,n γ), and 24.2 14 from (p,n γ). Mult.: from $\gamma\gamma(\text{DCO})$ and $\gamma(\text{lin pol})$ in (¹⁸ O, α 3n γ). δ : others: +0.58 4 or +3.5 3 from (p,n γ).

Adopted Levels, Gammas (continued)

$\gamma(^{63}\text{Zn})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^{\ddagger}$	$I_\gamma^{\ddagger}$	E_f	J_f^π	Mult.#	$\delta^\#$	$\alpha^\dagger$	Comments
1063.51	7/2 ⁻	1063.5 3	100.0 19	0.0	3/2 ⁻	E2		0.000254 4	B(E2)(W.u.)<70 $\alpha(K)=0.0002282$ 32; $\alpha(L)=2.285\times 10^{-5}$ 32; $\alpha(M)=3.27\times 10^{-6}$ 5 $\alpha(N)=1.312\times 10^{-7}$ 18 E_γ : unweighted average of 1063.2 1 from ($^{18}\text{O},\alpha 3n\gamma$), 1064.1 2 from ($\alpha,n\gamma$), and 1063.2 2 from (p,n γ). I_γ : from ($\alpha,n\gamma$). Others: 100 6 from ($^{16}\text{O},2pn\gamma$) and 100.0 25 from (p,n γ). Mult.: from $\gamma\gamma(\text{DCO})$ and $\gamma(\text{lin pol})$ in ($^{18}\text{O},\alpha 3n\gamma$). $\alpha(K)=0.00323$ 5; $\alpha(L)=0.000333$ 5; $\alpha(M)=4.76\times 10^{-5}$ 7 $\alpha(N)=1.827\times 10^{-6}$ 26 E_γ : other: 415.0 13 from ^{63}Ga $\varepsilon+\beta^+$ decay. I_γ : weighted average of 13 8 from ^{63}Ga $\varepsilon+\beta^+$ decay and 4.2 5 from (p,n γ).
1065.36	1/2 ⁻	415.2 2	4.2 6	650.05 5/2 ⁻	[E2]			0.00361 5	$\alpha(K)=0.000368$ 5; $\alpha(L)=3.71\times 10^{-5}$ 5; $\alpha(M)=5.31\times 10^{-6}$ 7 $\alpha(N)=2.115\times 10^{-7}$ 30 B(E2)(W.u.)<18 $\alpha(K)=0.000212$ 15; $\alpha(L)=2.12\times 10^{-5}$ 16; $\alpha(M)=3.04\times 10^{-6}$ 22 $\alpha(N)=1.22\times 10^{-7}$ 8 E_γ : weighted average of 1065.2 4 from ^{63}Ga $\varepsilon+\beta^+$ decay, 1065.9 2 from ($\alpha,n\gamma$), and 1065.2 2 from (p,n γ). I_γ : others: 100 20 from ^{63}Ga $\varepsilon+\beta^+$ decay, 100 from ($\alpha,n\gamma$). B(M1)(W.u.)<0.076 if M1, B(E2)(W.u.)<116 if E2. $\alpha(K)=0.001084$ 24; $\alpha(L)=0.0001101$ 24; $\alpha(M)=1.576\times 10^{-5}$ 35 $\alpha(N)=6.21\times 10^{-7}$ 13 B(M1)(W.u.)<0.0036; B(E2)(W.u.)<30 I_γ : weighted average of 5.9 6 from ($\alpha,n\gamma$) and 4.7 4 from (p,n γ). Other: 20.5 17 from ($^{16}\text{O},2pn\gamma$) is greatly discrepant with others and considered as an outlier. Mult.: D+Q from $\gamma(\theta)$; $\Delta\pi$ =no from level scheme. δ : other: -0.32 6 or -1.8 2 from (p,n γ). $\alpha(K)=0.001194$ 17; $\alpha(L)=0.0001217$ 17; $\alpha(M)=1.740\times 10^{-5}$ 25 $\alpha(N)=6.81\times 10^{-7}$ 10 B(E2)(W.u.)<161 E_γ : from ($\alpha,n\gamma$). I_γ : from ($^{16}\text{O},2pn\gamma$). Other: >9.9 from ($\alpha,n\gamma$). B(M1)(W.u.)<0.0014; B(E2)(W.u.)<40
		872.4 2	5.3 5	192.89 5/2 ⁻	[E2]			0.000411 6	
		1065.5 3	100.0 7	0.0 3/2 ⁻	[M1,E2]			0.000237 17	
1206.43	7/2 ⁻	556.3 2	5.1 6	650.05 5/2 ⁻	(M1+E2)		-1.24 9	1.21×10^{-3} 3	
		569.4 3	20.5 17	637.09 3/2 ⁻	[E2]			1.33×10^{-3} 2	
		1013.42 10	100 4	192.89 5/2 ⁻	M1+E2		+4.7 +1-7	0.000283 4	

Adopted Levels, Gammas (continued)

$\gamma(^{63}\text{Zn})$ (continued)									
<u>E_i(level)</u>	<u>J_i^{π}</u>	<u>E_{γ}^{$\ddagger$}</u>	<u>I_{γ}^{$\ddagger$}</u>	<u>E_f</u>	<u>J_f^{π}</u>	<u>Mult.#</u>	<u>δ[#]</u>	<u>α^{$\dagger$}</u>	<u>Comments</u>
1206.43	7/2 ⁻	1206.44 13	92 6	0.0	3/2 ⁻	E2		0.0002009 28	$\alpha(\text{K})=0.000254$ 4; $\alpha(\text{L})=2.54\times 10^{-5}$ 4; $\alpha(\text{M})=3.65\times 10^{-6}$ 5 $\alpha(\text{N})=1.459\times 10^{-7}$ 21 E _{γ} : weighted average of 1013.4 3 from (¹⁸ O, α 3n γ), 1013.4 1 from (α ,n γ), and 1013.45 10 from (p,n γ). I _{γ} : others: 100 5 from (¹⁶ O,2pn γ), 100 9 from (¹⁸ O, α 3n γ), 100 5 from (α ,n γ). B(E2)(W.u.)<16 $\alpha(\text{K})=0.0001716$ 24; $\alpha(\text{L})=1.714\times 10^{-5}$ 24; $\alpha(\text{M})=2.456\times 10^{-6}$ 34 $\alpha(\text{N})=9.87\times 10^{-8}$ 14; $\alpha(\text{IPF})=9.67\times 10^{-6}$ 14 E _{γ} : weighted average of 1206.4 3 from (¹⁸ O, α 3n γ), 1206.8 2 from (α ,n γ), and 1206.34 11 from (p,n γ). I _{γ} : unweighted average of 81 5 from (¹⁶ O,2pn γ), 84 6 from (¹⁸ O, α 3n γ), 92 5 from (α ,n γ), and 109 5 from (p,n γ). Mult.: from $\gamma\gamma$ (DCO) and γ (lin pol) in (¹⁸ O, α 3n γ) and γ (θ ,pol) in (α ,n γ).
1284.26	5/2 ⁻	634.5 5	13.3 10	650.05	5/2 ⁻	[M1,E2]		0.00081 16	$\alpha(\text{K})=0.00073$ 14; $\alpha(\text{L})=7.3\times 10^{-5}$ 15; $\alpha(\text{M})=1.05\times 10^{-5}$ 21 $\alpha(\text{N})=4.2\times 10^{-7}$ 8 B(M1)(W.u.)<0.018 if M1, B(E2)(W.u.)<78 if E2. B(E2)(W.u.)<26 $\alpha(\text{K})=0.0002424$ 34; $\alpha(\text{L})=2.429\times 10^{-5}$ 34; $\alpha(\text{M})=3.48\times 10^{-6}$ 5 $\alpha(\text{N})=1.393\times 10^{-7}$ 20 E _{γ} : weighted average of 1036.3 2 from (α ,n γ) and 1036.34 8 from (p,n γ). I _{γ} : unweighted average of 58.1 32 from (α ,n γ) and 47.5 23 from (p,n γ).
		1036.33 8	53 5	247.86	1/2 ⁻	E2		0.000270 4	$\alpha(\text{K})=0.000201$ 14; $\alpha(\text{L})=2.01\times 10^{-5}$ 14; $\alpha(\text{M})=2.88\times 10^{-6}$ 20 $\alpha(\text{N})=1.16\times 10^{-7}$ 8 E _{γ} : weighted average of 1091.6 1 from (α ,n γ) and 1091.40 8 from (p,n γ). I _{γ} : other: 100.0 34 from (α ,n γ). Mult.: D+Q from γ (θ); $\Delta\pi$ =no from level scheme. δ : +0.39 5 or -4.3 12 from (α ,n γ) and -0.50 8 or 10 +19-4 from (p,n γ). B(M1)(W.u.)<0.025 if M1, B(E2)(W.u.)<36 if E2. B(M1)(W.u.)<0.0015; B(E2)(W.u.)<0.85 $\alpha(\text{K})=0.0001409$ 26; $\alpha(\text{L})=1.402\times 10^{-5}$ 26; $\alpha(\text{M})=2.01\times 10^{-6}$ 4 $\alpha(\text{N})=8.13\times 10^{-8}$ 15; $\alpha(\text{IPF})=2.03\times 10^{-5}$ 9 E _{γ} : weighted average of 1284.0 5 from (α ,n γ) and 1284.21 15 from
		1091.48 10	100.0 26	192.89	5/2 ⁻	(M1+E2)		0.000225 15	
		1284.19 15	10.9 9	0.0	3/2 ⁻	M1+E2	-0.7 2	0.000177 4	

Adopted Levels, Gammas (continued)

$\gamma(^{63}\text{Zn})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^{\ddagger}$	$I_\gamma^{\ddagger}$	E_f	J_f^π	Mult.#	$\delta^\#$	$\alpha^\dagger$	Comments
1395.37	3/2 ⁻	768.37 17	56 18	627.09	1/2 ⁻	M1+E2		0.00050 7	(p,n γ). I γ : weighted average of 10.3 10 from (α ,n γ) and 11.4 9 from (p,n γ). δ : others: -0.75 +30-20 from (p,n γ). α (K)=0.00045 6; α (L)=4.5 $\times 10^{-5}$ 7; α (M)=6.5 $\times 10^{-6}$ 9 α (N)=2.59 $\times 10^{-7}$ 35 E γ : weighted average of 768.5 2 from ^{63}Ga ε + β^+ decay, 766.4 9 from (α ,n γ), and 768.36 12 from (p,n γ). I γ : unweighted average of 51 6 from ^{63}Ga ε + β^+ decay, 90 4 from (α ,n γ), and 27.6 17 from (p,n γ). δ : +0.37 +25-18 or ≥ 3 from (p,n γ). B(M1)(W.u.)=0.17 +6-5 if M1. B(E2)(W.u.)=4.8 $\times 10^2$ +19-15 exceeds RUL=300 if E2. α (K)=0.000181 11; α (L)=1.81 $\times 10^{-5}$ 12; α (M)=2.59 $\times 10^{-6}$ 16 α (N)=1.04 $\times 10^{-7}$ 6; α (IPF)=2.5 $\times 10^{-6}$ 4 E γ : weighted average of 1147.0 8 from ^{63}Ga ε + β^+ decay, 1146.5 6 from (α ,n γ), and 1147.3 4 from (p,n γ). I γ : weighted average of 8.4 19 from ^{63}Ga ε + β^+ decay, 10 4 from (α ,n γ), and 9.6 12 from (p,n γ). Mult.: D+Q from $\gamma(\theta)$ in (p,n γ); $\Delta\pi$ =no from level scheme. B(M1)(W.u.)=0.0083 +33-20 if M1, B(E2)(W.u.)=10.8 +44-26 if E2. α (K)=0.000164 9; α (L)=1.64 $\times 10^{-5}$ 9; α (M)=2.34 $\times 10^{-6}$ 13 α (N)=9.5 $\times 10^{-8}$ 5; α (IPF)=7.8 $\times 10^{-6}$ 13 E γ : weighted average of 1203.4 20 from ^{63}Ga ε + β^+ decay, 1201.5 5 from (α ,n γ), and 1202.8 5 from (p,n γ). I γ : weighted average of 6.5 33 from ^{63}Ga ε + β^+ decay, 8 6 from (α ,n γ), and 5.7 7 from (p,n γ). Mult.: D+Q from $\gamma(\theta)$ in (p,n γ); $\Delta\pi$ =no from level scheme. B(M1)(W.u.)=0.0045 +17-11 if M1, B(E2)(W.u.)=5.3 +21-13 if E2. B(M1)(W.u.)=0.043 +15-10; B(E2)(W.u.)=6.0 +49-30 α (K)=0.0001177 18; α (L)=1.169 $\times 10^{-5}$ 18; α (M)=1.676 $\times 10^{-6}$ 26 α (N)=6.80 $\times 10^{-8}$ 11; α (IPF)=4.11 $\times 10^{-5}$ 13 E γ : weighted average of 1395.4 3 from ^{63}Ga ε + β^+ decay, 1393.3 9 from (α ,n γ), and 1395.39 15 from (p,n γ). I γ : others: 100 19 from ^{63}Ga ε + β^+ decay and 100.0 21 from (α ,n γ). δ : weighted average of 0.36 +14-10 from (α ,n γ) and +0.78 +45-33 fro (p,n γ).
		1147.1 4	9.3 12	247.86	1/2 ⁻	(M1+E2)		0.000204 13	
		1202.2 5	5.8 7	192.89	5/2 ⁻	(M1+E2)		0.000191 11	
		1395.35 22	100.0 19	0.0	3/2 ⁻	M1+E2	+0.40 +14-12	0.0001722 32	

Adopted Levels, Gammas (continued)

$\gamma(^{63}\text{Zn})$ (continued)									
$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.#	$\delta^\#$	$\alpha^\dagger$	Comments
1436.29	9/2 ⁻	1243.31 10	100	192.89	5/2 ⁻	E2		0.0001952 27	B(E2)(W.u.)=19 +8-4 $\alpha(\text{K})=0.0001606$ 22; $\alpha(\text{L})=1.604\times 10^{-5}$ 22; $\alpha(\text{M})=2.298\times 10^{-6}$ 32 $\alpha(\text{N})=9.24\times 10^{-8}$ 13; $\alpha(\text{IPF})=1.612\times 10^{-5}$ 23 E_γ : weighted average of 1243.6 5 from (¹⁸ O, α 3n γ), 1244.2 7 from (α ,n γ), and 1243.28 10 from (p,n γ). Mult.: E2(+M3) from $\gamma(\theta)$ and $\gamma(\text{lin pol})$ in (α ,n γ) and (p,n γ); M3 component ruled out by RUL.
1664.75	7/2 ⁻	1014 1	22.1 20	650.05	5/2 ⁻	[M1,E2]		0.000264 21	$\alpha(\text{K})=0.000237$ 19; $\alpha(\text{L})=2.37\times 10^{-5}$ 20; $\alpha(\text{M})=3.39\times 10^{-6}$ 28 $\alpha(\text{N})=1.36\times 10^{-7}$ 10 B(M1)(W.u.)=0.0114 +40-26 if M1, B(E2)(W.u.)=19 +7-4 if E2.
		1027.8 2	20.2 14	637.09	3/2 ⁻	E2		0.000276 4	$\alpha(\text{K})=0.0002471$ 35; $\alpha(\text{L})=2.477\times 10^{-5}$ 35; $\alpha(\text{M})=3.55\times 10^{-6}$ 5 $\alpha(\text{N})=1.420\times 10^{-7}$ 20 B(E2)(W.u.)=16 +6-4 Mult., δ : $\delta(\text{O/Q})=-0.18$ 10 or -3.7 +10-20 from $\gamma(\theta)$ in 1982Pa01 in (p,n γ) for J=7/2; M2 and O components are ruled out by RUL.
		1472.0 2	100.0 13	192.89	5/2 ⁻	M1+E2	+0.15 4	0.0001763 25	B(M1)(W.u.)=0.017 +6-4; B(E2)(W.u.)=0.30 +22-14 $\alpha(\text{K})=0.0001053$ 15; $\alpha(\text{L})=1.046\times 10^{-5}$ 15; $\alpha(\text{M})=1.499\times 10^{-6}$ 21 $\alpha(\text{N})=6.08\times 10^{-8}$ 9; $\alpha(\text{IPF})=5.89\times 10^{-5}$ 9 E_γ : weighted average of 1471.3 5 from (α ,n γ) and 1472.0 1 from (p,n γ). I_γ : from (α ,n γ). Other: 100 4 from (p,n γ). δ : weighted average of +0.18 3 from (α ,n γ) and +0.11 3 (p,n γ). B(E2)(W.u.)=2.1 +8-5
		1664.7 3	29 4	0.0	3/2 ⁻	E2		0.0002533 35	$\alpha(\text{K})=8.81\times 10^{-5}$ 12; $\alpha(\text{L})=8.76\times 10^{-6}$ 12; $\alpha(\text{M})=1.255\times 10^{-6}$ 18 $\alpha(\text{N})=5.07\times 10^{-8}$ 7; $\alpha(\text{IPF})=0.0001552$ 22 E_γ : weighted average of 1664.0 6 from (α ,n γ) and 1664.8 2 from (p,n γ). I_γ : unweighted average of 33.3 13 from (α ,n γ) and 24.9 17 from (p,n γ). δ : E2(+M3) from $\gamma(\theta)$ and $\gamma(\text{lin pol})$ in (α ,n γ); M3 ruled out by RUL.
1691.23	5/2 ⁻	1054.0 3	6.4 8	637.09	3/2 ⁻	[M1,E2]		0.000242 18	$\alpha(\text{K})=0.000217$ 16; $\alpha(\text{L})=2.17\times 10^{-5}$ 17; $\alpha(\text{M})=3.11\times 10^{-6}$ 24 $\alpha(\text{N})=1.25\times 10^{-7}$ 9 E_γ : weighted average of 1054.6 9 from ⁶³ Ga $\varepsilon+\beta^+$ decay, 1053.7 5 from (α ,n γ), and 1054.1 3 from (p,n γ). I_γ : weighted average of 9 5 from ⁶³ Ga $\varepsilon+\beta^+$ decay, 6.8 34 from (α ,n γ), and 6.3 8 from (p,n γ). B(M1)(W.u.)=0.0144 +40-34 if M1, B(E2)(W.u.)=22 +6-5 if E2.
		1498.4 2	11.5 8	192.89	5/2 ⁻	(M1+E2)		0.000193 14	$\alpha(\text{K})=0.000105$ 4; $\alpha(\text{L})=1.05\times 10^{-5}$ 4; $\alpha(\text{M})=1.50\times 10^{-6}$ 6

Adopted Levels, Gammas (continued)

$\gamma(^{63}\text{Zn})$ (continued)

<u>E_i(level)</u>	<u>J_i^{π}</u>	<u>E_{γ}^{$\ddagger$}</u>	<u>I_{γ}^{$\ddagger$}</u>	<u>E_f</u>	<u>J_f^{π}</u>	<u>Mult.[#]</u>	<u>$\delta^{\#}$</u>	<u>$\alpha^{\ddagger}$</u>	<u>Comments</u>
1691.23	5/2 ⁻	1691.2 1	100.00 12	0.0	3/2 ⁻	M1+E2	-0.10 3	0.0002233 31	$\alpha(\text{N})=6.06\times 10^{-8}$ 21; $\alpha(\text{IPF})=7.6\times 10^{-5}$ 10 E _{γ} : weighted average of 1498.5 6 from ⁶³ Ga $\varepsilon+\beta^+$ decay, 1498.6 3 from ($\alpha,\text{n}\gamma$), and 1498.3 2 from ($\text{p},\text{n}\gamma$). I _{γ} : weighted average of 11 6 from ⁶³ Ga $\varepsilon+\beta^+$ decay, 6.8 34 from ($\alpha,\text{n}\gamma$), and 11.8 8 from ($\text{p},\text{n}\gamma$). Mult.: D+Q from $\gamma(\theta)$ in ($\text{p},\text{n}\gamma$); $\Delta\pi$ =no from level scheme. δ : $-0.2\leq\delta\leq 2.8$ from ($\text{p},\text{n}\gamma$). B(M1)(W.u.)=0.0090 +23-20 if M1, B(E2)(W.u.)=6.9 +18-15 if E2. B(M1)(W.u.)=0.054 +13-11; B(E2)(W.u.)=0.33 +25-17 $\alpha(\text{K})=8.13\times 10^{-5}$ 11; $\alpha(\text{L})=8.06\times 10^{-6}$ 11; $\alpha(\text{M})=1.155\times 10^{-6}$ 16 $\alpha(\text{N})=4.69\times 10^{-8}$ 7; $\alpha(\text{IPF})=0.0001328$ 19 E _{γ} : others: 1691.7 5 from ⁶³ Ga $\varepsilon+\beta^+$ decay and 1691.6 4 from ($\alpha,\text{n}\gamma$). I _{γ} : others: 100 19 from ⁶³ Ga $\varepsilon+\beta^+$ decay and 100.0 12 from ($\alpha,\text{n}\gamma$). δ : others: -0.19 6 or -2.0 3 from ($\text{p},\text{n}\gamma$). $\alpha(\text{K})=0.00288$ 4; $\alpha(\text{L})=0.000289$ 4; $\alpha(\text{M})=4.13\times 10^{-5}$ 6 $\alpha(\text{N})=1.622\times 10^{-6}$ 24 B(E1)(W.u.)=1.00 $\times 10^{-5}$ +39-35 E _{γ} : from (¹⁸ O, α 3n γ). I _{γ} : unweighted average of 2.34 11 from (¹⁶ O,2pn γ) and 1.1 4 from (¹⁸ O, α 3n γ). $\alpha(\text{K})=0.000538$ 8; $\alpha(\text{L})=5.38\times 10^{-5}$ 8; $\alpha(\text{M})=7.70\times 10^{-6}$ 12 $\alpha(\text{N})=3.07\times 10^{-7}$ 5 B(E1)(W.u.)=1.47 $\times 10^{-5}$ +37-29; B(M2)(W.u.)<0.55 E _{γ} : weighted average of 496.6 1 from (¹⁸ O, α 3n γ), 496.6 2 from ($\alpha,\text{n}\gamma$), and 496.56 12 from ($\text{p},\text{n}\gamma$). I _{γ} : unweighted average of 17.2 9 from (¹⁶ O,2pn γ), 12.1 7 from (¹⁸ O, α 3n γ), 17.7 12 from ($\alpha,\text{n}\gamma$), and 17.8 15 from ($\text{p},\text{n}\gamma$). δ : other: -0.01 3 from ($\text{p},\text{n}\gamma$). $\alpha(\text{K})=0.000293$ 4; $\alpha(\text{L})=2.92\times 10^{-5}$ 4; $\alpha(\text{M})=4.18\times 10^{-6}$ 6 $\alpha(\text{N})=1.675\times 10^{-7}$ 23 B(E1)(W.u.)=4.3 $\times 10^{-5}$ +6-5 E _{γ} : weighted average of 639.8 1 from (¹⁸ O, α 3n γ), 639.7 1 from ($\alpha,\text{n}\gamma$), and 639.64 10 from ($\text{p},\text{n}\gamma$). I _{γ} : from ($\alpha,\text{n}\gamma$). Others: 100 5 from (¹⁶ O,2pn γ), 100.0 21 from (¹⁸ O, α 3n γ), and 100.0 15 from ($\text{p},\text{n}\gamma$).
1703.11	9/2 ⁺	266.5 5	1.7 6	1436.29	9/2 ⁻	[E1]		0.00321 5	
		496.59 10	16.2 14	1206.43	7/2 ⁻	E1(+M2)	+0.02 2	0.000600 9	
		639.71 10	100.0 12	1063.51	7/2 ⁻	(E1)		0.000326 5	

Adopted Levels, Gammas (continued)

$\gamma(^{63}\text{Zn})$ (continued)									Comments
$E_i(\text{level})$	J_i^π	$E_\gamma^{\ddagger}$	$I_\gamma^{\ddagger}$	E_f	J_f^π	Mult. #	$\delta^\#$	$\alpha^\dagger$	
1703.11	9/2 ⁺	1510.0 5	2.1 4	192.89	5/2 ⁻	[M2]		0.0002427 34	Mult.: D(+Q) with $\delta=0.00$ 2 from ($\alpha, n\gamma$) and ($p, n\gamma$); D with $\Delta J=1$ from $\gamma\gamma(\text{DCO})$ in ($^{16}\text{O}, 2p n\gamma$) and ($^{18}\text{O}, \alpha 3 n\gamma$); $\Delta\pi=\text{yes}$ from level scheme. $\alpha(\text{K})=0.0001944$ 27; $\alpha(\text{L})=1.945\times 10^{-5}$ 27; $\alpha(\text{M})=2.79\times 10^{-6}$ 4 $\alpha(\text{N})=1.130\times 10^{-7}$ 16; $\alpha(\text{IPF})=2.60\times 10^{-5}$ 4 $\text{B}(\text{M2})(\text{W.u.})=0.136 +33-28$ E_γ : from ($^{18}\text{O}, \alpha 3 n\gamma$). I_γ : weighted average of 2.39 27 from ($^{16}\text{O}, 2p n\gamma$) and 1.6 4 from ($^{18}\text{O}, \alpha 3 n\gamma$).
1860.93	9/2 ⁻	797.9 4	37.9 23	1063.51	7/2 ⁻	M1+E2	-0.04 2	0.000399 6	$\text{B}(\text{M1})(\text{W.u.})=0.022 +11-6$; $\text{B}(\text{E2})(\text{W.u.})=0.10 +14-7$ $\alpha(\text{K})=0.000358$ 5; $\alpha(\text{L})=3.58\times 10^{-5}$ 5; $\alpha(\text{M})=5.13\times 10^{-6}$ 7 $\alpha(\text{N})=2.073\times 10^{-7}$ 29 E_γ : unweighted average of 798.2 3 from ($\alpha, n\gamma$) and 797.5 2 from ($p, n\gamma$). I_γ : weighted average of 37 4 from ($\alpha, n\gamma$) and 38.2 23 from ($p, n\gamma$). δ : weighted average of -0.03 2 from ($\alpha, n\gamma$) and -0.07 4 from ($p, n\gamma$).
		1210.7 2	100.0 33	650.05	5/2 ⁻	E2		0.0002001 28	$\text{B}(\text{E2})(\text{W.u.})=20 +9-5$ $\alpha(\text{K})=0.0001702$ 24; $\alpha(\text{L})=1.701\times 10^{-5}$ 24; $\alpha(\text{M})=2.437\times 10^{-6}$ 34 $\alpha(\text{N})=9.79\times 10^{-8}$ 14; $\alpha(\text{IPF})=1.034\times 10^{-5}$ 15 E_γ : other: 1210.8 3 from ($\alpha, n\gamma$). I_γ : other: 100 4 from ($\alpha, n\gamma$).
		1668.2 4	15 10	192.89	5/2 ⁻	[E2]		0.000254 4	Mult.: E2(+M3) from ($\alpha, n\gamma$) and ($p, n\gamma$); M3 ruled out by RUL. $\alpha(\text{K})=8.78\times 10^{-5}$ 12; $\alpha(\text{L})=8.72\times 10^{-6}$ 12; $\alpha(\text{M})=1.250\times 10^{-6}$ 18 $\alpha(\text{N})=5.05\times 10^{-8}$ 7; $\alpha(\text{IPF})=0.0001567$ 22 $\text{B}(\text{E2})(\text{W.u.})=0.59 +49-32$ E_γ : weighted average of 1668.5 5 from ($\alpha, n\gamma$) and 1668.0 4 from ($p, n\gamma$). I_γ : unweighted average of 5.7 29 from ($\alpha, n\gamma$) and 25.0 33 from ($p, n\gamma$).
1909.26	3/2 ⁻	1272.3 2	9.7 7	637.09	3/2 ⁻	(M1+E2)			$\text{B}(\text{M1})(\text{W.u.})<0.0029$ if M1, $\text{B}(\text{E2})(\text{W.u.})<3.1$ if E2. δ : 0.0 2 or -4 +2-6 from ($p, n\gamma$).
		1716.3 2	32.2 20	192.89	5/2 ⁻	(M1+E2)			$\text{B}(\text{M1})(\text{W.u.})<0.0038$ if M1, $\text{B}(\text{E2})(\text{W.u.})<2.2$ if E2. δ : -0.15 11 or +2.5 7 from ($p, n\gamma$).
		1909.0 3	100 2	0.0	3/2 ⁻	(M1+E2)			$\text{B}(\text{M1})(\text{W.u.})<0.0082$ if M1, $\text{B}(\text{E2})(\text{W.u.})<3.9$ if E2. δ : -0.18 5 or -2.1 2 from ($p, n\gamma$).
1978.26	9/2 ⁻	1327.6 4	32.1 28	650.05	5/2 ⁻	E2		0.0001902 27	$\text{B}(\text{E2})(\text{W.u.})=11.8 +43-33$ $\alpha(\text{K})=0.0001395$ 20; $\alpha(\text{L})=1.392\times 10^{-5}$ 20; $\alpha(\text{M})=1.994\times 10^{-6}$ 28

Adopted Levels, Gammas (continued)

$\gamma(^{63}\text{Zn})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^\ddagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. [#]	$\delta^\#$	$\alpha^\dagger$	Comments
1978.26	9/2 ⁻	1785.5 2	100.0 26	192.89	5/2 ⁻	E2		0.000295 4	$\alpha(\text{N})=8.03\times 10^{-8}$ 11; $\alpha(\text{IPF})=3.47\times 10^{-5}$ 5 E $_\gamma$: weighted average of 1327.3 4 from (α ,n γ) and 1328.0 5 from (p,n γ). I $_\gamma$: weighted average of 29.9 26 from (α ,n γ) and 35.7 33 from (p,n γ). Mult.: E2(+M3) from (α ,n γ); M3 ruled out by RUL. B(E2)(W.u.)=8.3 +30-23 $\alpha(\text{K})=7.70\times 10^{-5}$ 11; $\alpha(\text{L})=7.65\times 10^{-6}$ 11; $\alpha(\text{M})=1.096\times 10^{-6}$ 15 $\alpha(\text{N})=4.43\times 10^{-8}$ 6; $\alpha(\text{IPF})=0.0002093$ 29 E $_\gamma$: other: 1785.1 6 from (α ,n γ). I $_\gamma$: from (α ,n γ). Other: 100.0 33 from (p,n γ). Mult.: E2+M3 from (α ,n γ); M3 ruled out by RUL.
2050.68	9/2 ⁻	844.2 4	54 11	1206.43	7/2 ⁻	[M1,E2]		0.00040 5	$\alpha(\text{K})=0.00036$ 4; $\alpha(\text{L})=3.6\times 10^{-5}$ 4; $\alpha(\text{M})=5.2\times 10^{-6}$ 6 $\alpha(\text{N})=2.07\times 10^{-7}$ 23 E $_\gamma$: weighted average of 844.6 7 from (α ,n γ) and 844.1 4 from (p,n γ). I $_\gamma$: unweighted average of 42.9 29 from (α ,n γ) and 64 5 from (p,n γ). B(M1)(W.u.)<0.046 if M1, B(E2)(W.u.)<112 if E2. $\alpha(\text{K})=0.0002360$ 35; $\alpha(\text{L})=2.35\times 10^{-5}$ 4; $\alpha(\text{M})=3.38\times 10^{-6}$ 5 $\alpha(\text{N})=1.364\times 10^{-7}$ 20 B(M1)(W.u.)<0.045; B(E2)(W.u.)<15 E $_\gamma$: from ($^{18}\text{O},\alpha 3\text{n}\gamma$). Others: 987.3 1 from (α ,n γ) and 987.1 2 from (p,n γ). I $_\gamma$: from (α ,n γ). Others: 100 5 from ($^{16}\text{O},2\text{p}\text{n}\gamma$), 100 8 from ($^{18}\text{O},\alpha 3\text{n}\gamma$), and 100 5 from (p,n γ). Mult.: D+Q from $\gamma(\theta)$; $\Delta\pi$ =no from level scheme. δ : others: -0.20 4 or -2.2 2 from (p,n γ). $\alpha(\text{K})=7.15\times 10^{-5}$ 10; $\alpha(\text{L})=7.09\times 10^{-6}$ 10; $\alpha(\text{M})=1.016\times 10^{-6}$ 14 $\alpha(\text{N})=4.11\times 10^{-8}$ 6; $\alpha(\text{IPF})=0.0002428$ 34 B(E2)(W.u.)<0.18 E $_\gamma$: from ($^{12}\text{C},2\text{p}\text{n}\gamma$). Other: 1857.6 3 from (α ,n γ), 1857.5 5 in ($^{18}\text{O},\alpha 3\text{n}\gamma$), 1858 in ($^{16}\text{O},2\text{p}\text{n}\gamma$). I $_\gamma$: from ($^{16}\text{O},2\text{p}\text{n}\gamma$). B(M1)(W.u.)=0.018 +11-6; B(E2)(W.u.)=52 +29-18 $\alpha(\text{K})=0.0001028$ 15; $\alpha(\text{L})=1.022\times 10^{-5}$ 15; $\alpha(\text{M})=1.465\times 10^{-6}$ 21 $\alpha(\text{N})=5.92\times 10^{-8}$ 8; $\alpha(\text{IPF})=9.38\times 10^{-5}$ 15 E $_\gamma$: weighted average of 1530.0 4 from (α ,n γ) and 1530.8 3 from (p,n γ).
		987.2 1	100.0 29	1063.51	7/2 ⁻	(M1+E2)	+0.40 5	0.000263 4	
		1857.6 3	4.1 5	192.89	5/2 ⁻	[E2]		0.000322 5	
2157.67	3/2 ⁻	1530.5 4	66.7 33	627.09	1/2 ⁻	M1+E2	-2.0 2	0.0002083 31	

Adopted Levels, Gammas (continued)

$\gamma(^{63}\text{Zn})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^{\ddagger}$	$I_\gamma^{\ddagger}$	E_f	J_f^π	Mult.#	$\delta^\#$	$\alpha^\dagger$	Comments
									I_γ : other: 11.1 <i>11</i> from $(\alpha, n\gamma)$ is discrepant, which may stem from 1910 γ not being recognized as a doublet by 1979Mu09 in $(\alpha, n\gamma)$. 1982Pa01 in $(p, n\gamma)$ state that only 30% of the total intensity of this doublet is from 2158 level and if all intensity is assigned to decay of 2158 level, the resulting branching would be close to that in 1979Mu09 . δ : other: ≥ 0.4 from $(p, n\gamma)$. $B(M1)(W.u.)=0.011 +7-4$; $B(E2)(W.u.)=27 +15-9$ $\alpha(K)=6.74\times 10^{-5}$ 9; $\alpha(L)=6.69\times 10^{-6}$ 9; $\alpha(M)=9.58\times 10^{-7}$ 13 $\alpha(N)=3.88\times 10^{-8}$ 5; $\alpha(IPF)=0.000260$ 4 E_γ : unweighted average of 1909.3 4 from $(\alpha, n\gamma)$ and 1910.4 3 from $(p, n\gamma)$. I_γ : from $(\alpha, n\gamma)$. Other: 100.0 33 from $(p, n\gamma)$. δ : other: $+1.7 +26-8$ from $(p, n\gamma)$. $B(E2)(W.u.)<182$ $\alpha(K)=0.001194$ 22; $\alpha(L)=0.0001216$ 22; $\alpha(M)=1.740\times 10^{-5}$ 32 $\alpha(N)=6.81\times 10^{-7}$ 13 $B(M3)(W.u.)<1.4\times 10^7$ upper limit exceeds RUL=10. E_γ, I_γ : from $(\alpha, n\gamma)$. $\alpha(K)=0.00041$ 5; $\alpha(L)=4.1\times 10^{-5}$ 6; $\alpha(M)=5.9\times 10^{-6}$ 8 $\alpha(N)=2.37\times 10^{-7}$ 30 E_γ, I_γ : from $(\alpha, n\gamma)$. $B(M1)(W.u.)<0.007$ if M1, $B(E2)(W.u.)<19$ if E2. $\alpha(K)=0.0001838$ 26; $\alpha(L)=1.837\times 10^{-5}$ 26; $\alpha(M)=2.63\times 10^{-6}$ 4 $\alpha(N)=1.057\times 10^{-7}$ 15; $\alpha(IPF)=4.93\times 10^{-6}$ 8 $B(E2)(W.u.)<5.5$ E_γ, I_γ : from $(\alpha, n\gamma)$. $B(M1)(W.u.)=0.025 +14-9$; $B(E2)(W.u.)=25 +13-10$ $\alpha(K)=0.0001682$ 32; $\alpha(L)=1.677\times 10^{-5}$ 33; $\alpha(M)=2.40\times 10^{-6}$ 5 $\alpha(N)=9.70\times 10^{-8}$ 18; $\alpha(IPF)=5.62\times 10^{-6}$ 24 E_γ : weighted average of 1185.4 5 from $(\alpha, n\gamma)$ and 1184.8 2 from $(p, n\gamma)$. I_γ : from $(\alpha, n\gamma)$. Other: 100 4 from $(p, n\gamma)$. $B(E2)(W.u.)=8.9 +40-37$ $\alpha(K)=9.53\times 10^{-5}$ 13; $\alpha(L)=9.48\times 10^{-6}$ 13; $\alpha(M)=1.358\times 10^{-6}$ 19
2157.67	3/2 ⁻	1909.9 6	100.0 <i>11</i>	247.86	1/2 ⁻	M1+E2	-2.3 2	0.000335 5	
2233.35	11/2 ⁻	570.2 5	90.5 24	1664.75	7/2 ⁻	E2(+M3)	-0.03 3	1.33 $\times 10^{-3}$ 2	
		796.6 3	48 5	1436.29	9/2 ⁻	[M1,E2]		0.00046 6	
		1169.6 4	100 5	1063.51	7/2 ⁻	[E2]		0.0002098 29	
2249.14	9/2 ⁻	1184.9 2	100.0 28	1063.51	7/2 ⁻	M1+E2	+0.9 2	0.000193 4	
		1599.8 2	71 30	650.05	5/2 ⁻	E2		0.0002331 33	

Adopted Levels, Gammas (continued)

$\gamma(^{63}\text{Zn})$ (continued)									Comments
$E_i(\text{level})$	J_i^π	$E_\gamma^{\ddagger}$	$I_\gamma^{\ddagger}$	E_f	J_f^π	Mult. #	$\delta^\#$	$\alpha^\dagger$	
2261.52	1/2 ⁻	1634.4 2	100.0 27	627.09	1/2 ⁻	(M1)		0.0002081 29	$\alpha(\text{N})=5.49\times 10^{-8}$ 8; $\alpha(\text{IPF})=0.0001269$ 18 E_γ : other: 1599.5 5 from $(\alpha, n\gamma)$. I_γ : unweighted average of 40.9 28 from $(\alpha, n\gamma)$ and 100 4 from $(p, n\gamma)$. Mult.: E2(+M3) from $(\alpha, n\gamma)$; M3 ruled out by RUL. Other: D+Q from $(p, n\gamma)$ for J(2249)=5/2,7/2. $\alpha(\text{K})=8.65\times 10^{-5}$ 12; $\alpha(\text{L})=8.58\times 10^{-6}$ 12; $\alpha(\text{M})=1.230\times 10^{-6}$ 17 $\alpha(\text{N})=5.00\times 10^{-8}$ 7; $\alpha(\text{IPF})=0.0001118$ 16 $\text{B}(\text{M1})(\text{W.u.})=0.053 +21-16$ Mult.: D+Q with $\delta=-0.5 +3-4$ from $\gamma(\theta)$ in $(p, n\gamma)$; $\Delta\pi=\text{no}$ and no E2 component from level scheme.
		2261.5 3	35.1 27	0.0	3/2 ⁻	(M1+E2)		0.000460 35	$\alpha(\text{K})=4.92\times 10^{-5}$ 11; $\alpha(\text{L})=4.87\times 10^{-6}$ 11; $\alpha(\text{M})=6.98\times 10^{-7}$ 15 $\alpha(\text{N})=2.83\times 10^{-8}$ 6; $\alpha(\text{IPF})=0.000405$ 34 Mult.: D+Q from $\gamma(\theta)$ in $(p, n\gamma)$; $\Delta\pi=\text{no}$ from level scheme.
2288.36	7/2 ⁻	1081.9 3	47.1 30	1206.43	7/2 ⁻	[M1,E2]		0.000229 16	$\text{B}(\text{M1})(\text{W.u.})=0.0071 +29-22$ if M1, $\text{B}(\text{E2})(\text{W.u.})=2.4 +10-7$ if E2. $\alpha(\text{K})=0.000205$ 14; $\alpha(\text{L})=2.05\times 10^{-5}$ 15; $\alpha(\text{M})=2.94\times 10^{-6}$ 21 $\alpha(\text{N})=1.18\times 10^{-7}$ 8 $\text{B}(\text{M1})(\text{W.u.})<0.028$ if M1, $\text{B}(\text{E2})(\text{W.u.})<42$ if E2.
		1638.3 3	100.0 30	650.05	5/2 ⁻	(M1+E2)		0.000227 18	$\alpha(\text{K})=8.85\times 10^{-5}$ 27; $\alpha(\text{L})=8.79\times 10^{-6}$ 28; $\alpha(\text{M})=1.26\times 10^{-6}$ 4 $\alpha(\text{N})=5.10\times 10^{-8}$ 15; $\alpha(\text{IPF})=0.000128$ 15 E_γ : weighted average of 1639.1 5 from $(\alpha, n\gamma)$ and 1638.2 2 from $(p, n\gamma)$. Mult.: D+Q from $\gamma(\theta)$ in $(p, n\gamma)$; $\Delta\pi=\text{no}$ from level scheme.
2291.43	3/2 ⁻	1641.7 3	87 5	650.05	5/2 ⁻	[M1,E2]		0.000228 18	$\delta: -2.0$ 2 or -0.25 4 from $(p, n\gamma)$. $\text{B}(\text{M1})(\text{W.u.})<0.017$ if M1, $\text{B}(\text{E2})(\text{W.u.})<11$ if E2. $\alpha(\text{K})=8.82\times 10^{-5}$ 27; $\alpha(\text{L})=8.76\times 10^{-6}$ 28; $\alpha(\text{M})=1.25\times 10^{-6}$ 4 $\alpha(\text{N})=5.08\times 10^{-8}$ 15; $\alpha(\text{IPF})=0.000130$ 15 E_γ : other: 1639.1 5 from $(\alpha, n\gamma)$ could be a doublet considering 2288+2291 is not resolved in $(\alpha, n\gamma)$ $(p, n\gamma)$.
		1654.2 2	100 5	637.09	3/2 ⁻	(M1+E2)	>-0.5	0.000235 15	$\text{B}(\text{M1})(\text{W.u.})=0.031 +14-9$ if M1, $\text{B}(\text{E2})(\text{W.u.})=20 +9-6$ if E2. $\alpha(\text{K})=8.74\times 10^{-5}$ 22; $\alpha(\text{L})=8.68\times 10^{-6}$ 23; $\alpha(\text{M})=1.244\times 10^{-6}$ 32 $\alpha(\text{N})=5.04\times 10^{-8}$ 12; $\alpha(\text{IPF})=0.000138$ 13 $\text{B}(\text{M1})(\text{W.u.})=0.033 +20-14$; $\text{B}(\text{E2})(\text{W.u.})<6.6$
		2042.8 9	33 4	247.86	1/2 ⁻	M1+E2	-0.6 3	0.000356 12	Mult.: D+Q from $\gamma(\theta)$ in $(p, n\gamma)$; $\Delta\pi=\text{no}$ from level scheme. $\text{B}(\text{M1})(\text{W.u.})=0.0045 +23-17$; $\text{B}(\text{E2})(\text{W.u.})=0.7 +6-5$ $\alpha(\text{K})=5.84\times 10^{-5}$ 9; $\alpha(\text{L})=5.78\times 10^{-6}$ 9; $\alpha(\text{M})=8.29\times 10^{-7}$ 13 $\alpha(\text{N})=3.37\times 10^{-8}$ 5; $\alpha(\text{IPF})=0.000291$ 11 E_γ : unweighted average of 2041.9 5 from $(\alpha, n\gamma)$ and 2043.6 3 from $(p, n\gamma)$. δ : weighted average of -0.6 3 from $(\alpha, n\gamma)$ and $-0.5 +3-5$ from $(p, n\gamma)$.

Adopted Levels, Gammas (continued)

<u>$\gamma(^{63}\text{Zn})$ (continued)</u>									
<u>$E_i(\text{level})$</u>	<u>J_i^π</u>	<u>$E_\gamma^\ddagger$</u>	<u>$I_\gamma^\ddagger$</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult.#</u>	<u>$\delta^\#$</u>	<u>$\alpha^\dagger$</u>	<u>Comments</u>
2293.00	3/2 ⁻	2045.1 3	100	247.86	1/2 ⁻	M1+E2	+1.7 +78-10	0.000385 25	$\alpha(\text{K})=5.93\times 10^{-5}$ 12; $\alpha(\text{L})=5.88\times 10^{-6}$ 12; $\alpha(\text{M})=8.42\times 10^{-7}$ 18 $\alpha(\text{N})=3.42\times 10^{-8}$ 7; $\alpha(\text{IPF})=0.000319$ 23 B(M1)(W.u.)=0.022 +40-18; B(E2)(W.u.)=26 +13-17 B(E2)(W.u.)=35 +12-7 $\alpha(\text{K})=0.0001572$ 22; $\alpha(\text{L})=1.570\times 10^{-5}$ 22; $\alpha(\text{M})=2.249\times 10^{-6}$ 31 $\alpha(\text{N})=9.05\times 10^{-8}$ 13; $\alpha(\text{IPF})=1.857\times 10^{-5}$ 26 E_γ : from ($^{18}\text{O},\alpha 3\text{n}\gamma$). Other: 1255.6 4 from ($\alpha,\text{n}\gamma$). Mult.: E2(+M3) from $\gamma(\theta)$ and $\gamma(\text{lin pol})$ in ($\alpha,\text{n}\gamma$); M3 ruled out by RUL.
2319.12	11/2 ⁻	1255.6 1	100	1063.51	7/2 ⁻	E2		0.0001938 27	E_γ : unweighted average of 676.1 3 from ($\alpha,\text{n}\gamma$) and 674.9 2 from (p,n γ). δ : other: -0.53 5 (p,n γ). δ : <0 for J=3/2, +0.09 +15-12 for J=5/2 from (p,n γ).
2378.6	9/2	675.5 6	100	1703.11	9/2 ⁺	D+Q	-2.5 +5-12		
2403.31	1/2,3/2,5/2	1380.0 2	100 8	1023.26	3/2 ⁻	D+Q			
		1776.4 5	54 8	627.09	1/2 ⁻				
2521.20	3/2 ⁻	1456.9 2	100 8	1063.51	7/2 ⁻				
		1871.9 2	96 8	650.05	5/2 ⁻				
2585.17	13/2 ⁺	881.8 5	100	1703.11	9/2 ⁺	E2		0.000400 6	B(E2)(W.u.)=20.1 +17-14 $\alpha(\text{K})=0.000359$ 5; $\alpha(\text{L})=3.61\times 10^{-5}$ 5; $\alpha(\text{M})=5.17\times 10^{-6}$ 7 $\alpha(\text{N})=2.059\times 10^{-7}$ 29 E_γ : unweighted average of 882.3 1 from ($^{18}\text{O},\alpha 3\text{n}\gamma$) and 881.3 2 from ($\alpha,\text{n}\gamma$). Mult.: E2+M2 from $\gamma(\theta)$ and $\gamma(\text{lin pol})$ in ($\alpha,\text{n}\gamma$); M3 ruled out by RUL; E2 also from $\gamma\gamma(\text{DCO})$ and $\gamma(\text{lin pol})$ in ($^{18}\text{O},\alpha 3\text{n}\gamma$).
2600.07	3/2 ⁻	1950.5 4	98 9	650.05	5/2 ⁻				
		2351.7 4	100 9	247.86	1/2 ⁻				
		2599.8 8	30 7	0.0	3/2 ⁻				
2609.1	1/2 ⁻ ,3/2 ⁻	1959.0 7	100 11	650.05	5/2 ⁻				
		1971.9 8	38 11	637.09	3/2 ⁻				
		2609.1 5	84 11	0.0	3/2 ⁻				
2634.91	7/2 ⁻	1428.2 3	100.0 29	1206.43	7/2 ⁻	M1(+E2)	+0.02 7	0.0001711 24	B(M1)(W.u.)=0.028 +12-7; B(E2)(W.u.)<0.27 $\alpha(\text{K})=0.0001114$ 16; $\alpha(\text{L})=1.106\times 10^{-5}$ 16; $\alpha(\text{M})=1.585\times 10^{-6}$ 22 $\alpha(\text{N})=6.43\times 10^{-8}$ 9; $\alpha(\text{IPF})=4.70\times 10^{-5}$ 7 E_γ : weighted average of 1428.5 4 from ($\alpha,\text{n}\gamma$) and 1428.1 3 from (p,n γ). I_γ : from ($\alpha,\text{n}\gamma$).

Adopted Levels, Gammas (continued)

$\gamma(^{63}\text{Zn})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^\ddagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. #	$\delta^\#$	$\alpha^\dagger$	Comments
2634.91	7/2 ⁻	2442.7 5	42.9 29	192.89	5/2 ⁻	[M1,E2]		0.00054 4	$\alpha(\text{K})=4.31\times 10^{-5}$ 9; $\alpha(\text{L})=4.26\times 10^{-6}$ 9; $\alpha(\text{M})=6.11\times 10^{-7}$ 13 $\alpha(\text{N})=2.48\times 10^{-8}$ 5; $\alpha(\text{IPF})=0.00049$ 4 E_γ, I_γ : from $(\alpha, n\gamma)$. Other: 2441.6 γ from $(p, n\gamma)$ is a composite peak of 2442+2443 as stated in 1982Pa01 . $\text{B}(\text{M1})(\text{W.u.})=0.0024$ +10-6 if M1, $\text{B}(\text{E2})(\text{W.u.})=0.70$ +27-16 if E2.
2690.9	5/2 ⁻	2443 1	100	247.86	1/2 ⁻				
2750.67	7/2 ⁻	2100.6 4	100 15	650.05	5/2 ⁻				
		2557.7 6	85 15	192.89	5/2 ⁻				
2826.72	11/2 ⁺	1123.6 3	100	1703.11	9/2 ⁺	M1+E2	+0.7 1	0.0002078 34	$\text{B}(\text{M1})(\text{W.u.})=0.036$ +16-9; $\text{B}(\text{E2})(\text{W.u.})=24$ +11-7 $\alpha(\text{K})=0.0001853$ 30; $\alpha(\text{L})=1.847\times 10^{-5}$ 30; $\alpha(\text{M})=2.65\times 10^{-6}$ 4 $\alpha(\text{N})=1.069\times 10^{-7}$ 17; $\alpha(\text{IPF})=1.30\times 10^{-6}$ 4 E_γ : weighted average of 1123.7 3 from $(^{18}\text{O}, \alpha 3n\gamma)$ and 1123.3 4 from $(\alpha, n\gamma)$.
2912.0	9/2	1705.5 5	100	1206.43	7/2 ⁻	D+Q	-1.7 1		E_γ : from $(\alpha, n\gamma)$.
2934.4	13/2 ⁻	616.4		2319.12	11/2 ⁻				E_γ : from $(^{18}\text{O}, \alpha 3n\gamma)$.
		1497.7 5	100	1436.29	9/2 ⁻	E2		0.0002067 29	$\text{B}(\text{E2})(\text{W.u.})=24$ +9-5 $\alpha(\text{K})=0.0001087$ 15; $\alpha(\text{L})=1.082\times 10^{-5}$ 15; $\alpha(\text{M})=1.550\times 10^{-6}$ 22 $\alpha(\text{N})=6.26\times 10^{-8}$ 9; $\alpha(\text{IPF})=8.56\times 10^{-5}$ 12 E_γ : weighted average of 1498.1 5 from $(^{18}\text{O}, \alpha 3n\gamma)$ and 1497.2 5 from $(\alpha, n\gamma)$. δ : E2(+M3) from $\gamma(\theta)$ and $\gamma(\text{lin pol})$ in $(\alpha, n\gamma)$; M3 ruled out by RUL.
3357.5		530.8 5	100	2826.72	11/2 ⁺				
3480.9	(13/2 ⁺)	654 1		2826.72	11/2 ⁺				
		1778.0 5	100	1703.11	9/2 ⁺				
3527.90	13/2 ⁽⁻⁾	1208.9 5	73 20	2319.12	11/2 ⁻	D			I_γ : other: 137 8 from $(^{16}\text{O}, 2p n\gamma)$. Mult.: from $\gamma\gamma(\text{DCO})$ in $(^{16}\text{O}, 2p n\gamma)$.
		1477.3 3	100 23	2050.68	9/2 ⁻	Q			I_γ : other: 100 6 from $(^{16}\text{O}, 2p n\gamma)$. Mult.: from $\gamma\gamma(\text{DCO})$ in $(^{16}\text{O}, 2p n\gamma)$.
3764.02	(17/2 ⁺)	1178.8 2	100	2585.17	13/2 ⁺	E2		0.0002073 29	$\alpha(\text{K})=0.0001806$ 25; $\alpha(\text{L})=1.805\times 10^{-5}$ 25; $\alpha(\text{M})=2.59\times 10^{-6}$ 4 $\alpha(\text{N})=1.039\times 10^{-7}$ 15; $\alpha(\text{IPF})=5.94\times 10^{-6}$ 9 E_γ : weighted average of 1178.9 1 from $(^{18}\text{O}, \alpha 3n\gamma)$, 1178.8 2 from $(^{12}\text{C}, 2p n\gamma)$, and 1177.7 5 from $(\alpha, n\gamma)$. Mult.: from $\gamma\gamma(\text{DCO})$ and $\gamma(\text{lin pol})$ in $(^{18}\text{O}, \alpha 3n\gamma)$.
3769.89	(15/2 ⁺)	943.2 5	19.9 5	2826.72	11/2 ⁺				I_γ : other: 79 5 from $(^{16}\text{O}, 2p n\gamma)$ is discrepant.
		1184.7 1	100 5	2585.17	13/2 ⁺				I_γ : also from $(^{16}\text{O}, 2p n\gamma)$.
3890.9		1306		2585.17	13/2 ⁺				
4257.3		899.8 5		3357.5					

Adopted Levels, Gammas (continued)

$\gamma(^{63}\text{Zn})$ (continued)							
$E_i(\text{level})$	J_i^π	$E_\gamma^{\ddagger}$	$I_\gamma^{\ddagger}$	E_f	J_f^π	Mult.#	$\alpha^\dagger$
4355.03	(15/2 ⁻)	590.9 5	14 7	3764.02	(17/2) ⁺	(D)	
		874.3 5	30 10	3480.9	(13/2) ⁺		
		1769.8 3	100 10	2585.17	13/2 ⁺	(D)	
4365.5		595.6 5	100	3769.89	(15/2) ⁺		
4684.2		1326.7 5	100	3357.5			
4776.2		421.2 5	100	4355.03	(15/2) ⁻		
4904		1139		3764.02	(17/2) ⁺		
5076.3		721.3 5	100	4355.03	(15/2) ⁻		
5076.6	(19/2 ⁺)	1185		3890.9			
		1306.7 3	100 18	3769.89	(15/2) ⁺	Q	
		1312.5 5	18 7	3764.02	(17/2) ⁺		
5334.6		1570.6 5	100	3764.02	(17/2) ⁺		
5346.2	(21/2) ⁺	1582.2 11	100	3764.02	(17/2) ⁺	E2	0.0002279 32
							B(E2)(W.u.)>14 $\alpha(K)=9.74\times 10^{-5}$ 14; $\alpha(L)=9.69\times 10^{-6}$ 14; $\alpha(M)=1.388\times 10^{-6}$ 20 $\alpha(N)=5.61\times 10^{-8}$ 8; $\alpha(IPF)=0.0001194$ 17 E_γ : unweighted average of 1582.0 1 from ($^{18}\text{O},\alpha 3n\gamma$), 1580.4 3 from ($^{12}\text{C},2pn\gamma$), and 1584.1 6 from ($\alpha,n\gamma$). Mult.: from $\gamma(\theta)$ and $\gamma(\text{lin pol})$ in ($\alpha,n\gamma$), and $\gamma\gamma(\text{DCO})$ and $\gamma(\text{lin pol})$ in ($^{18}\text{O},\alpha 3n\gamma$). Mult.: from $\gamma\gamma(\text{DCO})$ in ($^{16}\text{O},2pn\gamma$).
5406.54	(17/2 ⁻)	1878.8 5	100 @ 6	3527.90	13/2 ⁽⁻⁾	Q	
		2471.9 5	28 @ 6	2934.4	13/2 ⁻		
5424.53	(17/2 ⁻)	1660.4 5	78 @ 5	3764.02	(17/2) ⁺		
		1896.8 5	100 @ 6	3527.90	13/2 ⁽⁻⁾	Q	
		2489.9 5	10 @ 4	2934.4	13/2 ⁻		
5916.1	(19/2 ⁻)	491.6 5	57.5 @ 35	5424.53	(17/2) ⁻		
		509.6 5	48 6	5406.54	(17/2) ⁻		
		570.0 5	44 28	5346.2	(21/2) ⁺		
		1013 &		4904			
		1561.1 5	100 @ 6	4355.03	(15/2) ⁻		
6233.75	(21/2 ⁻)	317.6 5	24 7	5916.1	(19/2) ⁻	(D)	
		809.2 3	100 9	5424.53	(17/2) ⁻	Q	
		827.2 3	49 7	5406.54	(17/2) ⁻	Q	
							E_γ : seen only in ($^{28}\text{Si},4pn\gamma$). I_γ : from ($^{16}\text{O},2pn\gamma$). Other: 100 22 from ($^{18}\text{O},\alpha 3n\gamma$). I_γ : other: 54 3 from ($^{16}\text{O},2pn\gamma$) is discrepant. Mult.: from $\gamma\gamma(\text{DCO})$ in ($^{16}\text{O},2pn\gamma$). I_γ : other: 100 5 from ($^{16}\text{O},2pn\gamma$). Mult.: from $\gamma\gamma(\text{DCO})$ in ($^{16}\text{O},2pn\gamma$). I_γ : other: 144 8 from ($^{16}\text{O},2pn\gamma$) is discrepant. Mult.: from $\gamma\gamma(\text{DCO})$ in ($^{16}\text{O},2pn\gamma$).

Adopted Levels, Gammas (continued)

$\gamma(^{63}\text{Zn})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\ddagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. [#]	$\alpha^\dagger$	Comments
6233.75	(21/2 ⁻)	887.6 5 1157.2 5	17 2 13 5	5346.2 5076.6	(21/2) ⁺ (19/2 ⁺)	(D)		I_γ : from (¹⁶ O,2pn γ). I_γ : other: 184 9 from (¹⁶ O,2pn γ) is discrepant. Mult.: from $\gamma\gamma$ (DCO) in (¹⁶ O,2pn γ).
6385.6		1039.4 5	100	5346.2	(21/2) ⁺			Mult.: from $\gamma\gamma$ (DCO) in (¹⁶ O,2pn γ).
6487.4	(23/2 ⁺)	1410.8 5	100	5076.6	(19/2 ⁺)	Q		I_γ : unweighted average of 10.1 6 from (¹⁶ O,2pn γ) and 2.9 15 from (¹⁸ O, α 3n γ).
6569.6	(23/2) ⁻	335.8 5	7 4	6233.75	(21/2) ⁻	D		Mult.: from $\gamma\gamma$ (DCO) in (¹⁶ O,2pn γ). I_γ : from (¹⁶ O,2pn γ). Other: 10.3 18 from (¹⁸ O, α 3n γ). Mult.: from $\gamma\gamma$ (DCO) in (¹⁶ O,2pn γ). $\alpha(\text{K})=7.87\times 10^{-5}$ 11; $\alpha(\text{L})=7.80\times 10^{-6}$ 11; $\alpha(\text{M})=1.118\times 10^{-6}$ 16 $\alpha(\text{N})=4.52\times 10^{-8}$ 6; $\alpha(\text{IPF})=6.46\times 10^{-5}$ 9 I_γ : from (¹⁸ O, α 3n γ). Other: 100 6 from (¹⁶ O,2pn γ).
		653.4	10.5 7	5916.1	(19/2) ⁻	Q		
		1223.4	100.0 33	5346.2	(21/2) ⁺	E1	0.0001523 21	
7524.6		1139.0 5	100	6385.6				
7610.4	(25/2 ⁻)	1376.6 3	100	6233.75	(21/2) ⁻	Q		Mult.: from $\gamma\gamma$ (DCO) in (¹⁶ O,2pn γ).
7926.1	(27/2 ⁻)	1356.5 1	100	6569.6	(23/2) ⁻	Q		
9095.9	(29/2 ⁻)	1169.8 5		7926.1	(27/2) ⁻			
		1485.5 5	100	7610.4	(25/2) ⁻	(Q)		Mult.: from $\gamma\gamma$ (DCO) in (¹⁶ O,2pn γ).
9773.4	(31/2 ⁻)	1847.3 5	100	7926.1	(27/2) ⁻			
11048.4		1952.5 5	100	9095.9	(29/2) ⁻			

[†] Additional information 6.

[‡] From (p,n γ) up to 2751 level and from (¹⁸O, α 3n γ) above that, unless otherwise noted.

[#] From measured $\gamma(\theta)$ and $\gamma(\text{lin pol})$ in (α ,n γ) up to 5347 level and from $\gamma\gamma$ (DCO) and $\gamma(\text{lin pol})$ in (¹⁸O, α 3n γ) above that, unless otherwise. Where level T_{1/2} is present, it is also used to determine magnetic or electric nature of a transition based on RUL when $\gamma(\text{lin pol})$ data are not available.

[@] From (¹⁶O,2pn γ).

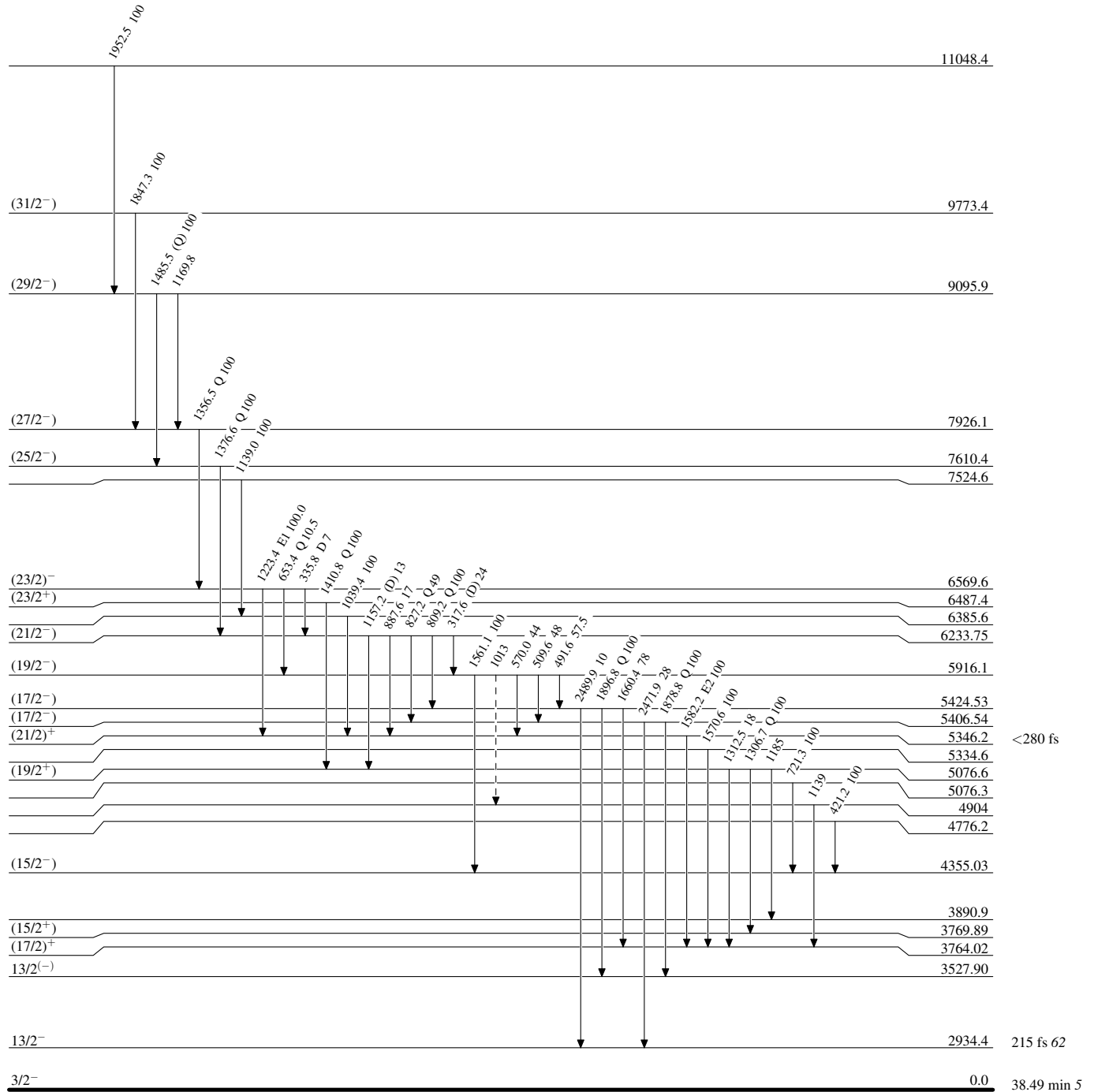
[&] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

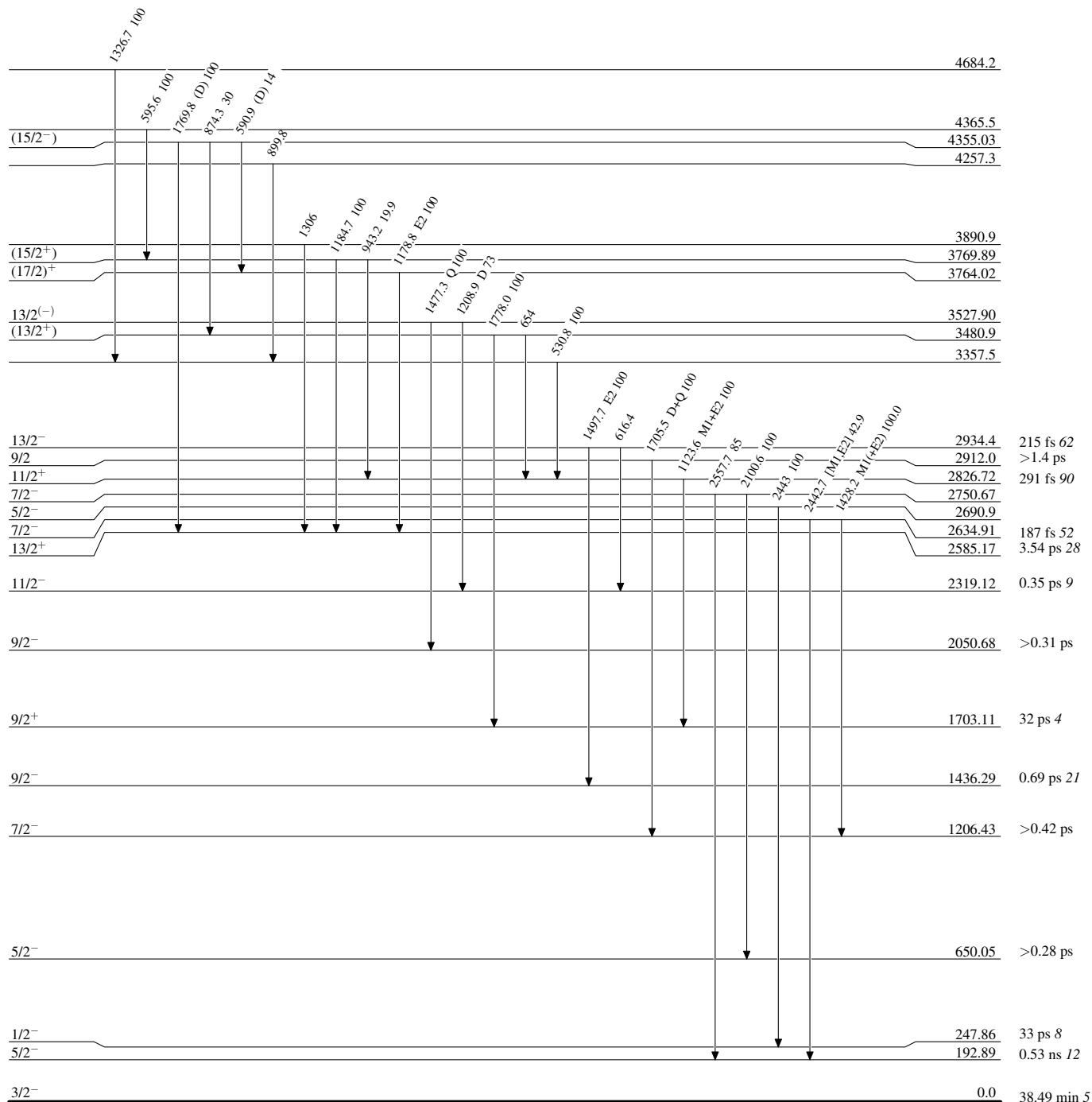
Level Scheme

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)

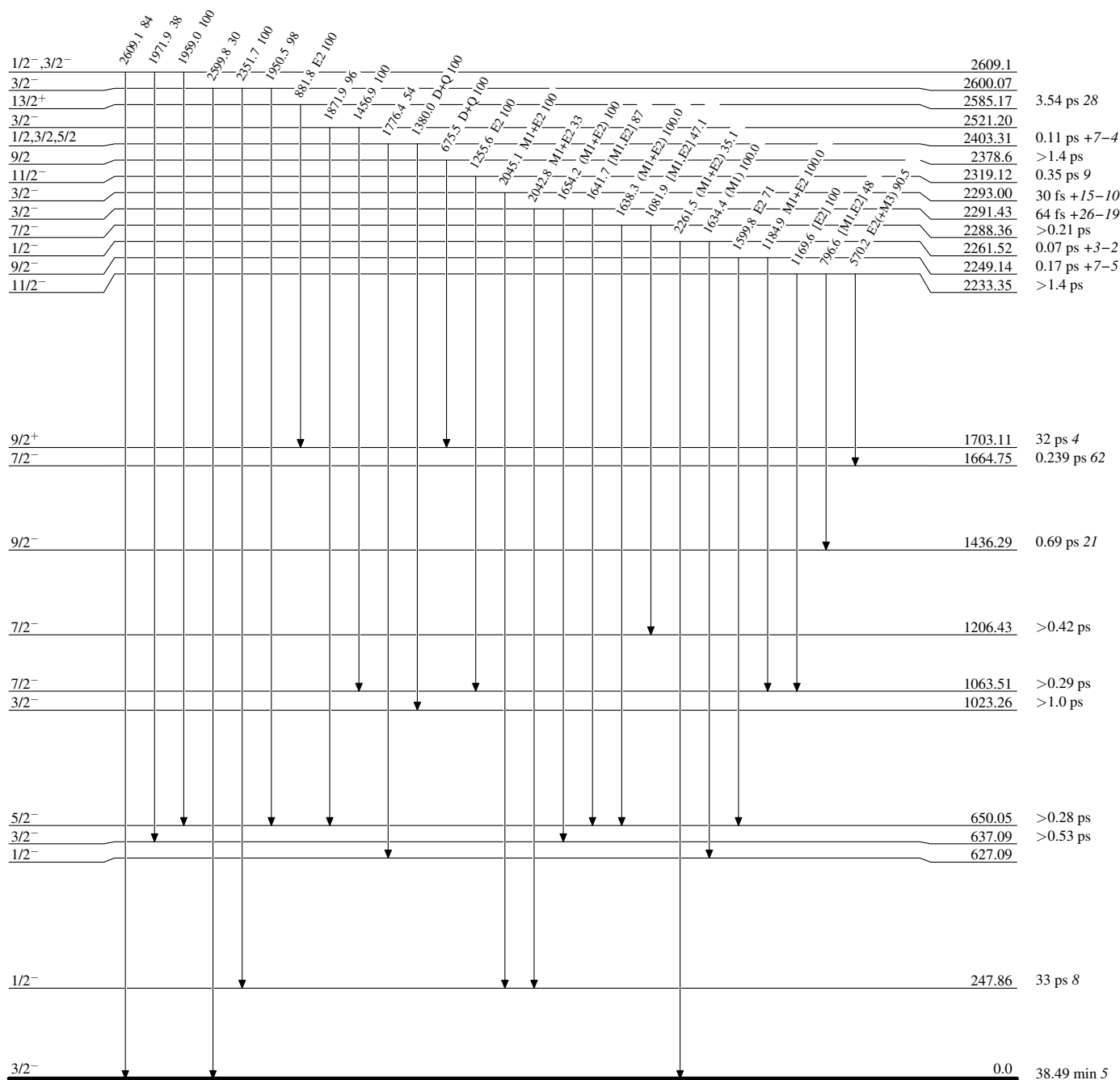
Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Relative photon branching from each level



Adopted Levels, Gammas**Level Scheme (continued)**

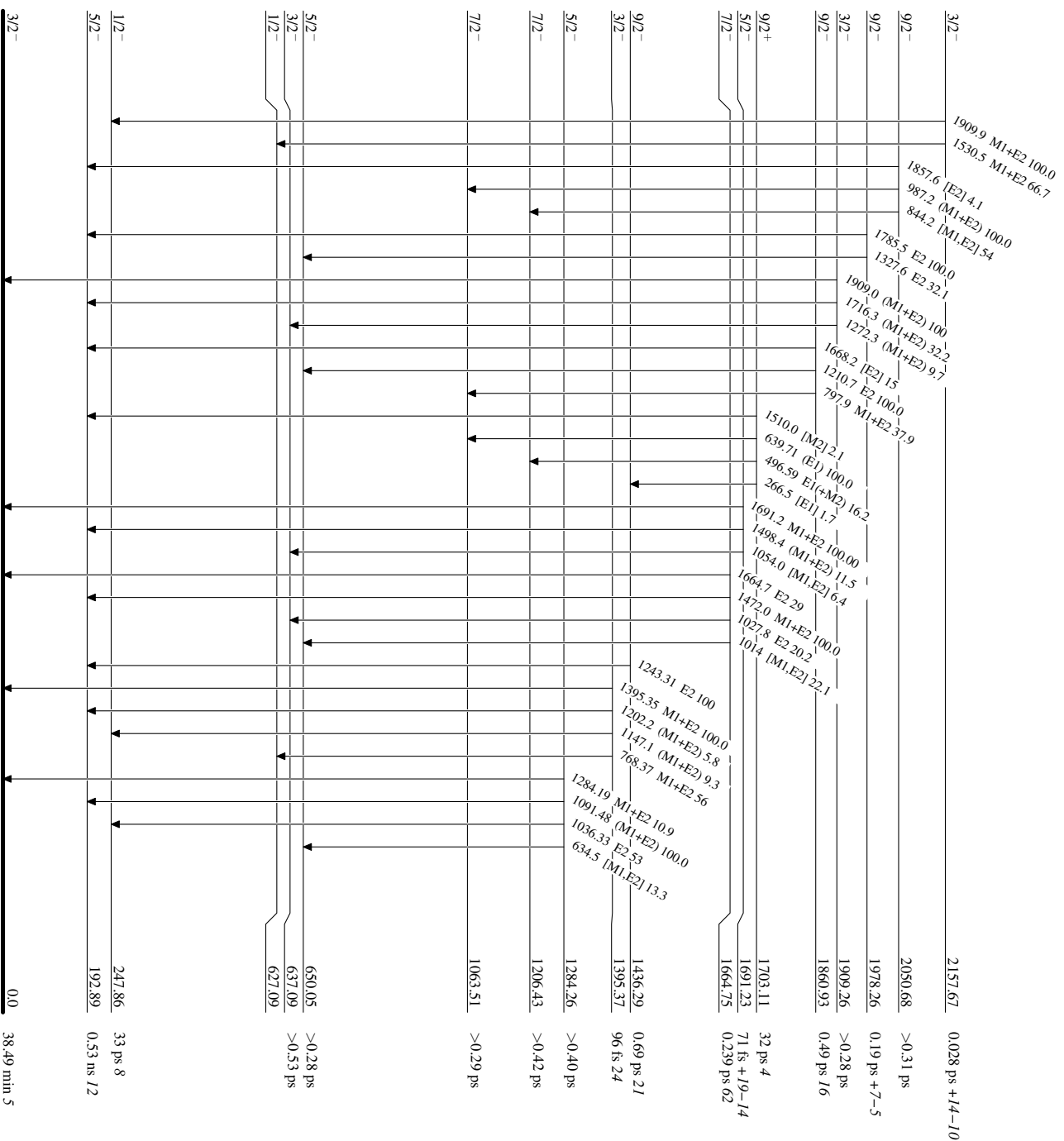
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

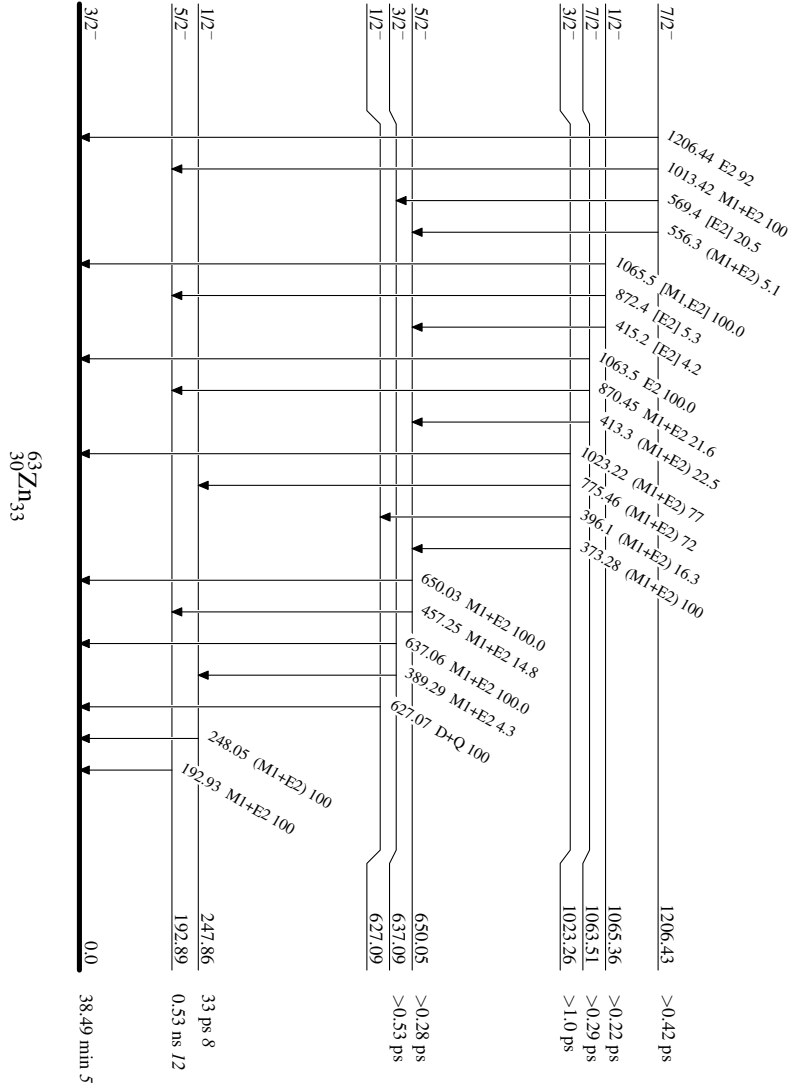
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



Adopted Levels, Gammas

