

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	E. A. McCutchan	NDS 113,1735 (2012)	1-Mar-2012

$Q(\beta^-) = -8084.3$; $S(n) = 12392.5$; $S(p) = 7388.9$ 23; $Q(\alpha) = -3399.9$ 20 [2012Wa38](#)

Note: Current evaluation has used the following Q record -8084.3 12392.5 7388.9 23 -3400.0 20 [2011AuZZ](#).

$S(2n) = 21514.3$, $S(2p) = 12657.7$ 21 ([2011AuZZ](#)).

α : [Additional information 1](#).

 ^{68}Ge LevelsCross Reference (XREF) Flags

A	^{68}As ε decay (151.6 s)	E	$^{12}\text{C}(^{64}\text{Zn}, ^8\text{Be}\gamma)$
B	^{69}Se εp decay (27.4 s)	F	$^{64}\text{Zn}(^6\text{Li}, d)$
C	$^{70}\text{Ge}(p, t)$	G	$^{58}\text{Ni}(^{12}\text{C}, 2p\gamma), ^{64}\text{Zn}(^7\text{Li}, p2n\gamma)$
D	$^{66}\text{Zn}(^{12}\text{C}, ^{10}\text{Be})$	H	(HI, xn γ)

E(level) [†]	J^π [‡]	$T_{1/2}$ [#]	XREF	Comments
0 [@]	0 ⁺	270.93 d 13	ABCDEFGH	$\% \varepsilon = 100$ $T_{1/2}$: weighted average of 270.82 d 27 (1981Wa26) and 270.99 d 19 (1994Sc44). Others: 228 d 6 (Rudstam thesis, Uppsala University, Sweden) and 275 d 20 (1956Cr29).
1015.81 [@] 8	2 ⁺	2.08 ps 11	ABCDE GH	$\mu = +1.1$ 3 J^π : L(p, t)=2. μ : from transient field method (2011StZZ, 2005Le19). $T_{1/2}$: weighted average of 2.15 ps 14 from DSAM in $^{12}\text{C}(^{64}\text{Zn}, ^8\text{Be}\gamma)$ and 1.98 ps 17 from DSAM and RDM in $^{58}\text{Ni}(^{12}\text{C}, 2p\gamma), ^{64}\text{Zn}(^7\text{Li}, p2n\gamma)$. Others: 2.1 ps 7 (1981De03), 3.5 ps +21-14 (1977Mo20), and 1.4 ps 7 (1977Gu08) all from DSAM/RDM in $^{58}\text{Ni}(^{12}\text{C}, 2p\gamma), ^{64}\text{Zn}(^7\text{Li}, p2n\gamma)$.
1754.5 ^{&} 4	0 ⁺		A Cd GH	J^π : L(p, t)=0.
1777.42 ^a 10	2 ⁺	1.80 ps 14	A CdE GH	$T_{1/2}$: from DSAM in $^{12}\text{C}(^{64}\text{Zn}, ^8\text{Be}\gamma)$. Others: >3.5 ps (1982Pa03), 3.5 ps +21-14 (1977Mo20), and 4.2 ps 7 (1977Gu08) from $^{58}\text{Ni}(^{12}\text{C}, 2p\gamma), ^{64}\text{Zn}(^7\text{Li}, p2n\gamma)$. J^π : E2 1777 γ to 0 ⁺ g.s.
2267.83 [@] 11	4 ⁺	0.87 ps 10	A CDE GH	J^π : L(p, t)=4. $T_{1/2}$: weighted average of 0.90 ps 14 from $^{12}\text{C}(^{64}\text{Zn}, ^8\text{Be}\gamma)$ and 0.83 ps 14 from $^{64}\text{Zn}(^7\text{Li}, p2n\gamma)$.
2428.59 ^a 12	3 ⁺	2.1 ps 7	A E GH	J^π : J=3 from $\gamma(\theta)$, $\gamma\gamma(\theta)(\text{DCO})$, π from 651 γ to 2 ⁺ .
2457.15 ^{&} 13	2 ⁺	1.3 ps 4	A E GH	$T_{1/2}$: from DSAM in $^{12}\text{C}(^{64}\text{Zn}, ^8\text{Be}\gamma)$. J^π : 190 γ to 4 ⁺ , 2457 γ to 0 ⁺ .
2617.3	0 ⁺		C	J^π : L(p, t)=0.
2648.67 ^b 11	3 ⁻	2.1 ps +14-7	A CDE GH	J^π : L(p, t)=3; J=3 from $\gamma(\theta)$ and $\gamma\gamma(\theta)(\text{DCO})$.
2831.86 ^a 11	4 ⁺	0.8 ps +7-3	A C E GH	J^π : L(p, t)=4.
2900.2 ^c 7	(4 ⁻)		H	
2947.1.5	2 ⁺		A C G	XREF: C(2942). J^π : L(p, t)=2.
3023.1.5	2 ⁺		A C	J^π : L(p, t)=2.
3040.73.23	(4 ⁺)		A d GH	J^π : J=(4) from $\gamma(\theta)$, M1+E2 612 γ to 3 ⁺ .
3061.87.11	(3 ⁻)		Cd GH	J^π : 2046 γ to 2 ⁺ , 587 γ from 5 ⁻ ; L(p, t)=(3).
3087.5.4	2 ⁽⁺⁾		A G	J^π : γ 's to 0 ⁺ , log ft=6.7 from ^{68}As ε decay ($J^\pi=3^+$).
3182.26 ^{&} 11	4 ⁺		C GH	J^π : L(p, t)=4; E2 1405 γ to 2 ⁺ .
3204.3	0 ⁺		C	J^π : L(p, t)=0.

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Adopted Levels, Gammas (continued) ^{68}Ge Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF	Comments
3287.8 7	2(+)		A	J ^π : 3288γ to 0 ⁺ ; log ft=7.0 from ^{68}As ε decay (J ^π =3 ⁺).
3400.3 4	2 ⁺		A C G	J ^π : γ's to 0 ⁺ ; log ft=6.2 from ^{68}As ε decay (J ^π =3 ⁺).
3417.0 4			A	
3474.7 10			A	E(level): log ft=6.2 from ^{68}As ε decay (J ^π =3 ⁺) suggests this is a distinct level from the 0 ⁺ 3476 3.
3476 3	0 ⁺		C F	J ^π : L(p,t)=L(^6Li ,d)=0.
3509.67 12	4 ⁻		H	
3522.1 10	2 ⁺		A C	J ^π : L(p,t)=2.
3581.98 ^b 12	5 ⁻	1.2 ps 4	C GH	E(level): doublet suggested by L(p,t)=(5+1). J ^π : E2 933γ to 3 ⁻ , E2 472γ from 7 ⁻ .
3604 3	4 ⁺		C	J ^π : L(p,t)=4.
3649.05 ^d 11	5 ⁻	0.4 ps +3-1	Cd GH	J ^π : E2 1000γ to 3 ⁻ , E2 405γ from 7 ⁻ ; L(p,t)=(4) discrepant.
3675.34 ^a 14	5 ⁺		d GH	J ^π : 1247γ to 3 ⁺ , band member.
3695.94 [@] 12	6 ⁺	0.49 ps 14	GH	J ^π : J=6 from γ(θ), DCO and yield function; E2 1428γ to 6 ⁺ .
3735 3	(2 ⁺)		C	J ^π : L(p,t)=(2).
3809.3 10	2 ⁺		A C	J ^π : L(p,t)=2.
3882.95 ^c 12	6 ⁻	132 ps 35	GH	μ=0.53 11 μ: from recoil into gas perturbed angular correlations (2011StZZ,1986Ba64). Relative to g=0.44 2 for the 596 2+ state in ^{74}Ge .
4021 3	4 ⁺		C	J ^π : J=6 from γ(θ), DCO and yield function; M1(+E2) 234γ to 5 ⁻ .
4037 3	(2 ⁺)		C	J ^π : L(p,t)=4.
4053.72 ^d 11	7 ⁻	118 ps 21	CD GH	J ^π : L(p,t)=(2). μ=0.78 12 J ^π : L(p,t)=(7); J=7 from γ(θ), DCO and yield function. μ: from recoil into gas perturbed angular correlations (2011StZZ,1986Ba64). Relative to g=0.44 2 for the 596 2+ state in ^{74}Ge .
4078 3	0 ⁺		C	J ^π : L(p,t)=0.
4144.07 ^{&} 11	6 ⁺		C H	J ^π : 962γ to 4 ⁺ , band member.
4238.5 10	(2 ⁺)		A C	J ^π : L(p,t)=(2).
4322 3	2 ⁺		C	J ^π : L(p,t)=2.
4358 3	0 ⁺		C	J ^π : L(p,t)=0.
4453.89 ^b 13	7 ⁻	0.97 ps 21	C GH	J ^π : J=7 from γ(θ), DCO and yield function; M1+E2 400γ to 7 ⁻ . L(p,t)=(6) discrepant (but the fit is poor).
4567.5 10	(2 ⁺)		A C	J ^π : L(p,t)=(2).
4614 3	(3 ⁻)		C	J ^π : L(p,t)=(3).
4659.46 13	7 ⁻	0.3 ps 1	CD GH	T _{1/2} : the B(E2)(606γ) exceeds RUL by a factor of ≈3, suggesting that the T _{1/2} value may be too small.
4736 3	0 ⁺		C	J ^π : L(p,t)=0.
4789 3	0 ⁺		C	J ^π : L(p,t)=0.
4836.97 [@] 12	8 ⁺	1.04 ps 21	D GH	μ=+0.8 3 μ: from transient field method (2011StZZ,1986Ba64); measured relative to a theoretical value of g=0.4 for the 3696, 6 ⁺ state in ^{68}Ge . J ^π : J=8 from γ(θ), DCO and yield function; E2 1141γ to 6 ⁺ .
4857 10			C	
4877.7 10			A C	
4957.40 ^c 15	8 ⁻	0.9 ps +4-2	GH	J ^π : J=8 from γ(θ), DCO and yield function; E2 1074γ to 6 ⁻ .
4999?		>0.35 ps	G	
5049.58 ^e 12	8 ⁺	0.49 ps +21-14	GH	μ=-2.2 10 μ: from transient field method (2011StZZ,1986Ba64); measured relative to a theoretical value of g=0.4 for the 3696, 6 ⁺ state in ^{68}Ge . J ^π : J=8 from γ(θ), DCO and yield function; E2 1354γ to 6 ⁺ .

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Adopted Levels, Gammas (continued) ^{68}Ge Levels (continued)

E(level) [†]	J $\pi^{\ddagger}$	T _{1/2} [#]	XREF	Comments
5074 10			C	
5148.69 13	(8 ⁻)	1.2 ps 3	D GH	
5217 10			C	
5266.6 ^a 10	7 ⁺		H	J π : 1591 γ to 5 ⁺ , band member.
5330.11 ^d 13	9 ⁻	0.69 ps +21-14	GH	J π : J=9 from $\gamma(\theta)$, DCO and yield function; E2 1276 γ to 7 ⁻ .
5366.08 ^{&} 13	8 ⁺	0.83 ps +28-21	GH	J π : J=8 from $\gamma(\theta)$, DCO and yield function; E2 1670 γ to 6 ⁺ .
5560 50			D	
5678.02 ^b 13	9 ⁻	0.5 ps 2	GH	J π : J=9 from $\gamma(\theta)$, DCO and yield function; E2 1224 γ to 7 ⁻ .
5821.61 14	9 ⁻	0.8 ps 4	GH	
5873.98 23	9 ⁺	1.5 ps +10-6	GH	
5961.49 [@] 14	10 ⁺	0.76 ps +21-14	GH	J π : J=10 from $\gamma(\theta)$, DCO and yield function; E2 1124 γ to 8 ⁺ .
6214.89 ^e 14	10 ⁺	<0.7 ps	GH	J π : J=10 from $\gamma(\theta)$, DCO and yield function; E2 1165 γ to 8 ⁺ .
6300 50	(8 ⁺)		D	J π : from crude shell-model calculations (1990Bo27). Configuration: $(\pi g_{9/2})^2_{8+}$ (1990Bo27).
6420.36 ^c 25	10 ⁻		H	
6556.52 14	(10 ⁻)		H	
6595.71 ^{&} 16	10 ⁺		H	J π : 1230 γ to 8 ⁺ , band member.
6663.81 24	10 ⁺		H	
6671.10? 16			H	
6960 50	(6 ⁺)		D	J π : from crude shell-model calculations (1990Bo27). Configuration: $(\pi g_{9/2} \pi d_{5/2})_{6+}$ (1990Bo27).
7044.83 ^d 16	11 ⁻	1.0 ps +4-3	GH	J π : J=11 from $\gamma(\theta)$, DCO and yield function; E2 1715 γ to 9 ⁻ .
7145.30 ^b 16	11 ⁻		GH	J π : J=11 from $\gamma(\theta)$, DCO and yield function; E2 1467 γ to 9 ⁻ .
7242.1? 10	(10 ⁺)	0.7 ps +7-4	G	J π : (E2) 1876 γ to 8 ⁺ .
7251.12 13	11 ⁻		H	
7320.1? 10	(12 ⁺)		H	
7371.21 [@] 15	12 ⁺	0.7 ps +14-3	GH	J π : J=12 from $\gamma(\theta)$, DCO and yield function; E2 1410 γ to 10 ⁺ .
7495.95 16	(11 ⁻)		H	
7516.89 ^e 14	12 ⁺		H	
7532.5 ^f 10	12 ⁺		H	
7559.38 ^g 14	12 ⁺	0.8 ps +6-4	GH	J π : J=12 from $\gamma(\theta)$, DCO and yield function; E2 1344 γ to 10 ⁺ .
7761.85 14	12 ⁺		H	
7881.5? 10			H	
8043.38 ^l 16	13 ⁺		H	
8171.94 14	13 ⁻		H	J π : J=13 from $\gamma(\theta)$; E2 921 γ to 11 ⁻ .
8621.5? 10			H	
8660.57 ^g 15	14 ⁺		H	
8663.3? 10			H	
8781.4? 10			H	
8790.26 ^h 17	15 ⁻		H	J π : J=15 from $\gamma(\theta)$; E2 618 γ to 13 ⁻ .
8868.18 19	14 ⁻		H	
8930.9? 10	(14 ⁺)		H	
9012.1 ^e 6	14 ⁺		H	
9112.5 6	14 ⁺		H	
9170.0 [@] 5	14 ⁺	0.4 ps 2	GH	J π : J=12 from $\gamma(\theta)$; E2 1798 γ to 12 ⁺ .
9386.56 17	15 ⁽⁻⁾		H	
9418.9 ^f 14	14 ⁺		H	
9563.9 ^j 8	15 ⁽⁻⁾		H	
9605.7 ^l 7	15 ⁺		H	
10024.58? 18			H	
10126.6 8	16 ⁽⁻⁾		H	

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Adopted Levels, Gammas (continued) ^{68}Ge Levels (continued)

E(level) [†]	J ^π [‡]	XREF
10217.53 ^g 24	16 ⁺	H
10295.51 ^h 25	17 ⁽⁻⁾	H
10493.4 6	16 ⁽⁻⁾	H
10664.0 ^e 7	16 ⁺	H
10665.6 6	17 ⁽⁻⁾	H
10688.8? 10		H
10896.0 7	16 ⁺	H
10897.0? 12		H
10927.0 ^j 5	17 ⁽⁻⁾	H
10957.9 7	16 ⁺	H
10988.1 6	16 ⁺	H
10989.8 ^l 12	17 ⁺	H
10990.0 [@] 11	16 ⁺	H
11085.6 ^f 17	16 ⁺	H
11406.4? 10		H
11417.4 17	16 ⁺	H
11542.7? 19	(17 ⁺)	H
11793.4? 13		H
11794.2? 10	(19 ⁻)	H
11832.2 10	(20 ⁻)	H
11994.4 ^g 6	18 ⁺	H
12136.9 ^h 3	19 ⁽⁻⁾	H
12165.0 8	(19 ⁻)	H
12246.0 ^e 6	18 ⁺	H
12262.5 ⁱ 8	(18 ⁻)	H
12363.4 ^j 7	(19 ⁻)	H
12501.8? 12		H
12535.8? 10		H
12641.7 17	(18 ⁺)	H
12652.3 13	(18 ⁻)	H
12719.4 ^f 19	18 ⁺	H
12779.1? 12		H
12817.2 ^l 16	19 ⁺	H
12884.1? 12		H
13104.3? 10		H
13265.3? 10		H
13617.4? 12		H
13751.3? 10		H
13953.0 ^e 12	20 ⁺	H
13991.0? 12		H
14085.5 ⁱ 7	(20 ⁻)	H
14116.5 ^g 12	20 ⁺	H
14360.9? 10		H
14401.9 ^h 10	21 ⁽⁻⁾	H
14426.6? 16	(21)	H
14485.6 ^j 8	(21 ⁻)	H
14504.9 ^l 19	21 ⁺	H
14560.4 6	(21)	H
15562.8 ^g 15	22 ⁺	H
15835.1 ^e 15	22 ⁺	H
16130.5 ⁱ 12	22 ⁽⁻⁾	H

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Adopted Levels, Gammas (continued) ^{68}Ge Levels (continued)

E(level) [†]	J ^π [‡]	XREF	Comments
16733.9 ^l 21	23 ⁺	H	
17360.5 [?] 21		H	
17496.0 ^h 14	23 ⁽⁻⁾	H	
18022.1 ^e 18	24 ⁺	H	
18132.5 ⁱ 16	24 ⁽⁻⁾	H	
18274.1 18		H	
19785.0 ^l 23	25 ⁺	H	
20356.6 ⁱ 19	26 ⁽⁻⁾	H	
20821.2 ^e 21	26 ⁺	H	
22958.6 ⁱ 21	28 ⁽⁻⁾	H	
x ^k	(14)	H	Additional information 2.
1575.0+x [?] k 6	(16)	H	Additional information 3.
1620.0+x ^k 10	(16)	H	
3425.0+x ^k 12	(18)	H	
5440.1+x ^k 16	(20)	H	
7677.1+x ^k 19	(22)	H	
10126.2+x ^k 21	(24)	H	
12815.2+x ^k 23	(26)	H	

[†] From a least squares fit to E γ 's for levels connected by γ 's; $\Delta E=0.3$ keV assumed when not given.

[‡] Unless noted otherwise, from $^{40}\text{Ca}(^{32}\text{S},4p\gamma)$ in (HI,xn γ) by [2001Wa02](#). Based on a DCO analysis (no explicit values given) and the assumption that levels decaying predominantly to negative parity levels have themselves negative parity. The 3649 5-, 3883 6-, and 4054 7- J^π assignments are taken from previous measurements.

From DSAM and RDM in $^{58}\text{Ni}(^{12}\text{C},2p\gamma)$, $^{64}\text{Zn}(^7\text{Li},2n\gamma)$..., except where noted.

@ Band(A): Yrast band.

& Band(B): Band based on 0⁺, 1755 level. [2001Wa02](#) and [1996Ch34](#) differ in the assignment of the 10⁺ member of this band, [1996Ch34](#) assign the 6671 level, while [2001Wa02](#) assign the 6597 level. The latter is adopted here.

^a Band(C): γ band ([2001Wa02](#)).

^b Band(D): Two ν quasiparticle band. One rotationally-aligned quasiparticle in $g_{9/2}$ and one deformation-aligned quasiparticle in $p_{1/2}$, $p_{3/2}$, or $f_{5/2}$ ([2001Wa02](#)).

^c Band(E): Even-spin signature partner of Band d ([1981De03,2001Wa02](#)).

^d Band(F): Two π quasiparticle band. One rotationally-aligned quasiparticle in $g_{9/2}$ and one deformation-aligned quasiparticle in $p_{1/2}$, $p_{3/2}$, or $f_{5/2}$ ([2001Wa02](#)).

^e Band(G): Band based on 8⁺ 5050 level. Proposed configuration of $\pi(g_{9/2})^2(f_{5/2},p_{3/2})^2$ and $\nu(g_{9/2})^2(f_{5/2},p_{3/2})^6$ ([2001Wa02](#)).

^f Band(H): Side-band based on 12⁺ 7533 level.

^g Band(I): Side-band based on 12⁺ 7560 level.

^h Band(J): Octupole band based on 15⁻ 8790 level. Proposed configuration of $\pi(g_{9/2})^1(f_{5/2},p_{3/2})^3$ and $\nu(g_{9/2})^2(f_{5/2},p_{3/2})^6$ ([2001Wa02](#)).

ⁱ Band(K): Octupole band based on (18⁻) 12263 level. Proposed configuration of $\pi(g_{9/2})^2(f_{5/2},p_{3/2})^2$ and $\nu(g_{9/2})^3(f_{5/2},p_{3/2})^5$ ([2001Wa02](#)).

^j Band(L): Octupole band built on the 15⁻ 9564 level.

^k Band(M): Super-deformed band ([2001Wa02](#)). Percent population=0.2%.

^l Band(N): Band based on 13⁺ 8043 level. Proposed configuration of $\pi(g_{9/2})^1(f_{5/2},p_{3/2})^3$ and $\nu(g_{9/2})^3(f_{5/2},p_{3/2})^5$ ([2001Wa02](#)).

Adopted Levels, Gammas (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\ddagger$	$\gamma(^{68}\text{Ge})$	
								α	Comments
1015.81	2 ⁺	1015.74 4	100	0	0 ⁺	E2		0.000341 5	$\alpha(\text{K})=0.000305$ 5; $\alpha(\text{L})=3.12\times 10^{-5}$ 5; $\alpha(\text{M})=4.66\times 10^{-6}$ 7; $\alpha(\text{N}+..)=3.04\times 10^{-7}$ 5 B(E2)(W.u.)=15.3 8 E_γ : from $^{64}\text{Zn}(^7\text{Li},\text{p}2\text{n}\gamma)$. Mult.: from $\gamma(\text{lin pol})$ in (HI,xn γ).
1754.5	0 ⁺	738.4 @ 5	100 @	1015.81	2 ⁺	E2		0.000760 11	$\alpha(\text{K})=0.000679$ 10; $\alpha(\text{L})=7.03\times 10^{-5}$ 10; $\alpha(\text{M})=1.048\times 10^{-5}$ 15; $\alpha(\text{N}+..)=6.78\times 10^{-7}$ Mult.: from $\gamma\gamma(\theta)(\text{DCO})$ in $^{58}\text{Ni}(^{12}\text{C},2\text{p}\gamma)$ (1981De03).
1777.42	2 ⁺	761.6 @ 1	100 @ 5	1015.81	2 ⁺	M1+E2	-0.15 3	0.000552 8	$\alpha(\text{K})=0.000494$ 7; $\alpha(\text{L})=5.05\times 10^{-5}$ 8; $\alpha(\text{M})=7.54\times 10^{-6}$ 11; $\alpha(\text{N}+..)=4.97\times 10^{-7}$ 7 B(E2)(W.u.)=1.0 5; B(M1)(W.u.)=0.0169 18 δ : Others: -0.49 7 from $\gamma(\theta)$ in $^{48}\text{Ca}(^{32}\text{S},4\text{p}\gamma)$, -0.09 2 from $\gamma(\theta)$ in $^{63}\text{Cu}(^7\text{Li},2\text{n}\gamma)$, -6 +2-5 or -0.65 10 from $\gamma(\theta)$ in $^{64}\text{Zn}(^7\text{Li},\text{p}2\text{n}\gamma)$, and -0.18 +20-10 from $\gamma(\theta)$ in $^{66}\text{Zn}(\alpha,2\text{n}\gamma)$.
		1777.3 @ 2	60 @ 4	0	0 ⁺	E2 [#]		0.000310 5	$\alpha(\text{K})=9.36\times 10^{-5}$ 14; $\alpha(\text{L})=9.48\times 10^{-6}$ 14; $\alpha(\text{M})=1.415\times 10^{-6}$ 20 $\alpha(\text{N}+..)=0.000205$ 3 B(E2)(W.u.)=0.40 5 I_γ : Others: 63 3 in $^{58}\text{Ni}(^{12}\text{C},2\text{p}\gamma)$ and 44.2 16 in (HI,xn γ).
2267.83	4 ⁺	1252.0 1	100	1015.81	2 ⁺	E2 [#]		0.000230 4	$\alpha(\text{K})=0.000190$ 3; $\alpha(\text{L})=1.94\times 10^{-5}$ 3; $\alpha(\text{M})=2.89\times 10^{-6}$ 4; $\alpha(\text{N}+..)=1.79\times 10^{-5}$ 3 B(E2)(W.u.)=12.8 15 δ : $\delta(\text{M3/E2})=0.0$ 1 from $\gamma(\theta)$ in $^{66}\text{Zn}(\alpha,2\text{n}\gamma)$.
2428.59	3 ⁺	651.2 @ 3	100 @ 5	1777.42	2 ⁺	M1+E2	+0.06 2	0.000772 11	$\alpha(\text{K})=0.000690$ 10; $\alpha(\text{L})=7.07\times 10^{-5}$ 10; $\alpha(\text{M})=1.056\times 10^{-5}$ 15; $\alpha(\text{N}+..)=6.96\times 10^{-7}$ B(E2)(W.u.)=0.34 +28-24; B(M1)(W.u.)=0.026 +13-7 δ : Others: +0.11 2 from $\gamma(\theta)$ in $^{48}\text{Ca}(^{32}\text{S},4\text{p}\gamma)$, -0.02 2 from $\gamma(\theta)$ in $^{63}\text{Cu}(^7\text{Li},2\text{n}\gamma)$, and -0.15 +10-50 from $\gamma(\theta)$ in $^{66}\text{Zn}(\alpha,2\text{n}\gamma)$.
		1413.3 @ 5	47.6 @ 24	1015.81	2 ⁺	M1+E2	+0.16 8	0.000200 3	$\alpha(\text{K})=0.0001396$ 20; $\alpha(\text{L})=1.415\times 10^{-5}$ 20; $\alpha(\text{M})=2.11\times 10^{-6}$ 3 $\alpha(\text{N}+..)=4.42\times 10^{-5}$ 8 B(E2)(W.u.)=0.023 +31-19; B(M1)(W.u.)=0.0012 +6-3 I_γ : Others: 36.6 19 in $^{58}\text{Ni}(^{12}\text{C},2\text{p}\gamma)$ and 6.9 15 in (HI,xn γ).
2457.15	2 ⁺	190.3 10	47 3	2267.83	4 ⁺	[E2]		0.0669 17	$\alpha(\text{K})=0.0592$ 15; $\alpha(\text{L})=0.00669$ 17; $\alpha(\text{M})=0.000992$ 25; $\alpha(\text{N}+..)=5.81\times 10^{-5}$ 14 B(E2)(W.u.)=2.5 $\times 10^4$ 8
		702.2 10	28.7 18	1754.5	0 ⁺	[E2]		0.000871 13	$\alpha(\text{K})=0.000778$ 12; $\alpha(\text{L})=8.06\times 10^{-5}$ 12; $\alpha(\text{M})=1.203\times 10^{-5}$ 18; $\alpha(\text{N}+..)=7.77\times 10^{-7}$ B(E2)(W.u.)=22 7 I_γ : Other: 69 8 in ^{68}As ε decay (151.6 s).

Adopted Levels, Gammas (continued)

$\gamma(^{68}\text{Ge})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\ddagger$	α	Comments
2457.15	2 ⁺	1441.0 10 2457.1 2	22 3 100 7	1015.81 0	2 ⁺ 0 ⁺	[E2]		0.000591 9	$\alpha(\text{K})=5.21\times 10^{-5}$ 8; $\alpha(\text{L})=5.26\times 10^{-6}$ 8; $\alpha(\text{M})=7.85\times 10^{-7}$ 11; $\alpha(\text{N}+..)=0.000533$ 8 B(E2)(W.u.)=0.15 5
2648.67	3 ⁻	871.2 2	5.27 24	1777.42	2 ⁺	[E1]		0.000201 3	$\alpha(\text{K})=0.000180$ 3; $\alpha(\text{L})=1.82\times 10^{-5}$ 3; $\alpha(\text{M})=2.72\times 10^{-6}$ 4; $\alpha(\text{N}+..)=1.781\times 10^{-7}$ 25 B(E1)(W.u.)=1.5 $\times 10^{-5}$ +7-6 I _{γ} : Other: 15 4 in ⁵⁸ Ni(¹² C,2p γ). $\alpha(\text{K})=5.91\times 10^{-5}$ 13; $\alpha(\text{L})=5.96\times 10^{-6}$ 13; $\alpha(\text{M})=8.90\times 10^{-7}$ 19; $\alpha(\text{N}+..)=5.86\times 10^{-8}$ 13 B(E1)(W.u.)=4.2 $\times 10^{-5}$ +20-17; B(M2)(W.u.)=0.6 5 δ : Others: -0.05 3 from $\gamma(\theta)$ in ⁴⁸ Ca(³² S,4p γ), +0.01 2 from $\gamma(\theta)$ in ⁶³ Cu(⁷ Li,2n γ), -0.11 9 from $\gamma(\theta)$ in ⁶⁴ Zn(⁷ Li,p2n γ), and -0.16 +20-50 from $\gamma(\theta)$ in ⁶⁶ Zn(α ,2n γ).
2831.86	4 ⁺	403.8 10 564.0 10 1054.4 2	2.5 3 6.8 6 100 3	2428.59 3 ⁺ 2267.83 4 ⁺ 1777.42 2 ⁺		E2		0.000312 5	$\alpha(\text{K})=0.000279$ 4; $\alpha(\text{L})=2.86\times 10^{-5}$ 4; $\alpha(\text{M})=4.27\times 10^{-6}$ 6; $\alpha(\text{N}+..)=2.79\times 10^{-7}$ 4 B(E2)(W.u.)=24 +14-10 Mult.: from $\gamma\gamma(\theta)$ (DCO). $\alpha(\text{K})=8.98\times 10^{-5}$ 13; $\alpha(\text{L})=9.10\times 10^{-6}$ 13; $\alpha(\text{M})=1.358\times 10^{-6}$ 19 $\alpha(\text{N}+..)=0.000223$ 4 B(E2)(W.u.)=0.47 +28-22 I _{γ} : Others: 33 3 in ⁵⁸ Ni(¹² C,2p γ) and 78 9 in ⁶⁸ As ε decay (151.6 s).
		1816.1 2	30.1 11	1015.81	2 ⁺	E2		0.000323 5	
2900.2	(4 ⁻)	251.5 10	100	2648.67	3 ⁻				
2947.1	2 ⁺	1169.7 @ 5	100 @	1777.42	2 ⁺				
3023.1	2 ⁺	1245.1 @ 10 2007.4 @ 5	13.0 @ 22 100 @ 9	1777.42 2 ⁺ 1015.81 2 ⁺					
3040.73	(4) ⁺	612.0 @ 3	100 @ 6	2428.59	3 ⁺	M1+E2	+0.24 4	0.000906 15	$\alpha(\text{K})=0.000810$ 13; $\alpha(\text{L})=8.31\times 10^{-5}$ 14; $\alpha(\text{M})=1.242\times 10^{-5}$ 21; $\alpha(\text{N}+..)=8.16\times 10^{-7}$
		1263.4 @ 3	53 @ 3	1777.42	2 ⁺				
3061.87	(3 ⁻)	2025.3 @ 10 230.0 1 413.2 & 1 633.3 1 794.0 2 2046.0 2	5.6 @ 8 17 28 17 28 100 28 78 28	1015.81 2 ⁺ 2831.86 4 ⁺ 2648.67 3 ⁻ 2428.59 3 ⁺ 2267.83 4 ⁺ 1015.81 2 ⁺					

Adopted Levels, Gammas (continued)

$\gamma(^{68}\text{Ge})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\ddagger$	α	Comments
3087.5	2 ⁽⁺⁾	1309.6 @ 10	47 @ 7	1777.42	2 ⁺				
		1332.8 @ 5	100 @ 7	1754.5	0 ⁺				
		2071.8 @ 10	27 @ 7	1015.81	2 ⁺				
		3088.3 @ 10	87 @ 7	0	0 ⁺				
3182.26	4 ⁺	725.1 1	59.8 22	2457.15	2 ⁺				
		915.0 10	21.2 11	2267.83	4 ⁺				
		1404.8 2	100 4	1777.42	2 ⁺	E2		0.000221 3	$\alpha(\text{K})=0.0001492$ 21; $\alpha(\text{L})=1.517\times 10^{-5}$ 22; $\alpha(\text{M})=2.26\times 10^{-6}$ 4 $\alpha(\text{N}+..)=5.47\times 10^{-5}$ 8
		2166.4 2	27.4 12	1015.81	2 ⁺				
3287.8	2 ⁽⁺⁾	2271.3 @ 10	100 @ 10	1015.81	2 ⁺				
		3288.4 @ 10	40 @ 10	0	0 ⁺				
3400.3	2 ⁺	1622.5 @ 5	100 @ 6	1777.42	2 ⁺				
		1645.9 @ 10	24.1 @ 19	1754.5	0 ⁺				
		2384.6 @ 10	22.2 @ 19	1015.81	2 ⁺				
		3401.3 @ 10	5.6 @ 19	0	0 ⁺				
3417.0		988.3 @ 5	59 @ 5	2428.59	3 ⁺				
		1639.9 @ 7	100 @ 5	1777.42	2 ⁺				
3474.7		2458.8 @ 10	100 @	1015.81	2 ⁺				
3509.67	4 ⁻	861.0 1	63 4	2648.67	3 ⁻				
		1081.1 1	100 5	2428.59	3 ⁺				
3522.1	2 ⁺	2506.2 @ 10	100 @	1015.81	2 ⁺				
3581.98	5 ⁻	520.1 & 1		3061.87	(3 ⁻)				
		750.1 2	13.4 4	2831.86	4 ⁺				
		933.3 2	22.2 7	2648.67	3 ⁻	E2		0.000418 6	$\alpha(\text{K})=0.000373$ 6; $\alpha(\text{L})=3.83\times 10^{-5}$ 6; $\alpha(\text{M})=5.72\times 10^{-6}$ 8; $\alpha(\text{N}+..)=3.73\times 10^{-7}$ 6 B(E2)(W.u.)=6.6 23
		1314.1 2	100 3	2267.83	4 ⁺	E1+M2	+0.04 3	0.000218 3	$\alpha(\text{K})=8.35\times 10^{-5}$ 15; $\alpha(\text{L})=8.44\times 10^{-6}$ 15; $\alpha(\text{M})=1.259\times 10^{-6}$ 22; $\alpha(\text{N}+..)=0.0001244$ B(E1)(W.u.)=0.00011 4; B(M2)(W.u.)=0.5 +8-5 δ : Others: -0.08 3 from $\gamma(\theta)$ in ⁴⁸ Ca(³² S,4p γ), +0.06 2 from $\gamma(\theta)$ in ⁶³ Cu(⁷ Li,2n γ), and -0.15 +10-50 from $\gamma(\theta)$ in ⁶⁶ Zn(α ,2n γ). Mult.: E1 from $\gamma(\text{lin pol})$ in ⁵⁸ Ni(¹² C,2p γ), ⁶⁴ Zn(⁷ Li,p2n γ).
3649.05	5 ⁻	587.2 1	8.5 15	3061.87	(3 ⁻)				
		817.2 1	2.6 15	2831.86	4 ⁺				
		1000.4 1	12.8 4	2648.67	3 ⁻	E2		0.000353 5	$\alpha(\text{K})=0.000316$ 5; $\alpha(\text{L})=3.24\times 10^{-5}$ 5; $\alpha(\text{M})=4.83\times 10^{-6}$ 7;

Adopted Levels, Gammas (continued)

$\gamma(^{68}\text{Ge})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\ddagger$	α	Comments
3649.05	5 ⁻	1381.2 1	100 3	2267.83	4 ⁺	E1+M2	+0.04 2	0.000253 4	$\alpha(\text{N}+..)=3.15\times 10^{-7}$ 5 B(E2)(W.u.)=8.8 +23-67 $\alpha(\text{K})=7.67\times 10^{-5}$ 12; $\alpha(\text{L})=7.75\times 10^{-6}$ 12; $\alpha(\text{M})=1.156\times 10^{-6}$ 18; $\alpha(\text{N}+..)=0.0001676$ B(E1)(W.u.)=0.00031 +7-14; B(M2)(W.u.)=1.2 +16-11 δ : Others: +0.01 2 from $\gamma(\theta)$ in $^{48}\text{Ca}(^{32}\text{S},4\text{py})$, -0.01 2 from $\gamma(\theta)$ in $^{63}\text{Cu}(^7\text{Li},2\text{n}\gamma)$, and -0.02 +2-15 from $\gamma(\theta)$ in $^{66}\text{Zn}(\alpha,2\text{n}\gamma)$. Mult.: E1 from $\gamma(\text{lin pol})$ in $^{58}\text{Ni}(^{12}\text{C},2\text{py})$, $^{64}\text{Zn}(^7\text{Li},\text{p}2\text{n}\gamma)$.
3675.34	5 ⁺	843.2 10	28.5 21	2831.86	4 ⁺				
		1246.7 2	100 6	2428.59	3 ⁺				
3695.94	6 ⁺	1428.1 1	100	2267.83	4 ⁺	E2		0.000223 4	$\alpha(\text{K})=0.0001442$ 21; $\alpha(\text{L})=1.466\times 10^{-5}$ 21; $\alpha(\text{M})=2.19\times 10^{-6}$ 3 $\alpha(\text{N}+..)=6.16\times 10^{-5}$ 9 B(E2)(W.u.)=12 4 δ : $\delta(\text{M3/E2})=-0.1$ 1 from $\gamma(\theta)$ in $^{66}\text{Zn}(\alpha,2\text{n}\gamma)$.
3809.3	2 ⁺	2793.4 @ 10	100 @	1015.81	2 ⁺				
3882.95	6 ⁻	207.6 1	1.0 16	3675.34	5 ⁺				
		233.9 1	100 3	3649.05	5 ⁻	M1(+E2)	0.01 2	0.00860 13	$\alpha(\text{K})=0.00767$ 11; $\alpha(\text{L})=0.000803$ 12; $\alpha(\text{M})=0.0001201$ 17; $\alpha(\text{N}+..)=7.84\times 10^{-6}$ B(E2)(W.u.)=0.04 +15-4; B(M1)(W.u.)=0.012 4 Mult., δ : from $\gamma(\theta)$ in $^{63}\text{Cu}(^7\text{Li},2\text{n}\gamma)$. Others: +0.07 1 from $\gamma(\theta)$ in $^{40}\text{Ca}(^{32}\text{S},4\text{py})$ and 0.00 +2-20 from $\gamma(\theta)$ in $^{66}\text{Zn}(\alpha,2\text{n}\gamma)$.
		373.3 1	1.44 5	3509.67	4 ⁻				
		982.7 & 10	1.33 5	2900.2	(4 ⁻)				
4053.72	7 ⁻	170.7 1	100 3	3882.95	6 ⁻	M1+E2	+0.04 2	0.0193 4	$\alpha(\text{K})=0.0172$ 3; $\alpha(\text{L})=0.00182$ 3; $\alpha(\text{M})=0.000272$ 5; $\alpha(\text{N}+..)=1.77\times 10^{-5}$ 3 B(E2)(W.u.)=1.6 +17-16; B(M1)(W.u.)=0.019 4 δ : Others: +0.07 1 from $\gamma(\theta)$ in $^{40}\text{Ca}(^{32}\text{S},4\text{py})$ and +0.05 1 from $\gamma(\theta)$ in $^{66}\text{Zn}(\alpha,2\text{n}\gamma)$.
		357.8 1	25.5 8	3695.94	6 ⁺	E1		0.0017 7	$\alpha(\text{K})=0.0015$ 6; $\alpha(\text{L})=0.00016$ 7; $\alpha(\text{M})=2.4\times 10^{-5}$ 10; $\alpha(\text{N}+..)=1.5\times 10^{-6}$ 7 B(E1)(W.u.)=9.8 $\times 10^{-6}$ 18 Mult.: from $\gamma(\theta)$ in $^{66}\text{Zn}(\alpha,2\text{n}\gamma)$. δ : $\delta(\text{M2/E1})=-0.07$ +10-20.
		404.7 1	26.8 8	3649.05	5 ⁻	E2		0.00463 7	$\alpha(\text{K})=0.00412$ 6; $\alpha(\text{L})=0.000438$ 7; $\alpha(\text{M})=6.52\times 10^{-5}$ 10; $\alpha(\text{N}+..)=4.10\times 10^{-6}$ 6 B(E2)(W.u.)=3.7 7 δ : $\delta(\text{M3/E2})=0.0$ +3-1 from $\gamma(\theta)$ in $^{66}\text{Zn}(\alpha,2\text{n}\gamma)$.
		471.7 1	40.1 14	3581.98	5 ⁻	E2		0.00282 4	I_γ : Other: 31.7 16 in $^{58}\text{Ni}(^{12}\text{C},2\text{py})$. $\alpha(\text{K})=0.00252$ 4; $\alpha(\text{L})=0.000265$ 4; $\alpha(\text{M})=3.95\times 10^{-5}$ 6;

Adopted Levels, Gammas (continued)

$\gamma(^{68}\text{Ge})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\ddagger$	α	Comments
									$\alpha(\text{N}+..)=2.51\times 10^{-6}$ 4 B(E2)(W.u.)=2.6 5 δ : $\delta(\text{M3/E2})=-0.07$ 10 from $\gamma(\theta)$ in $^{66}\text{Zn}(\alpha, 2n\gamma)$. I_γ : Other: 52 3 in $^{58}\text{Ni}(^{12}\text{C}, 2p\gamma)$.
4144.07	6 ⁺	448.2 10 961.8 1 1312.2 1 1876.2 1	6.4 5 100 3 39.7 15 73.7 24	3695.94 6 ⁺ 3182.26 4 ⁺ 2831.86 4 ⁺ 2267.83 4 ⁺					
4238.5	(2 ⁺)	3222.6 @ 10	100 @	1015.81 2 ⁺					
4453.89	7 ⁻	400.1 1	100 3	4053.72 7 ⁻	M1+E2	+0.5 2	0.0028 4		$\alpha(\text{K})=0.0025$ 3; $\alpha(\text{L})=0.00026$ 4; $\alpha(\text{M})=3.9\times 10^{-5}$ 5; $\alpha(\text{N}+..)=2.5\times 10^{-6}$ 3 B(E2)(W.u.)=4.E+2 3; B(M1)(W.u.)=0.17 5
		570.9 2 804.9 10 871.9 2	24.6 8 9 6 32.3 10	3882.95 6 ⁻ 3649.05 5 ⁻ 3581.98 5 ⁻					I_γ : Other: 18 5 in $^{58}\text{Ni}(^{12}\text{C}, 2p\gamma)$.
4567.5	(2 ⁺)	3551.6 @ 10	100 @	1015.81 2 ⁺					
4659.46	7 ⁻	205.5 1 605.7 3	100 3	4453.89 7 ⁻ 4053.72 7 ⁻	E2		0.001322 19		$\alpha(\text{K})=0.001180$ 17; $\alpha(\text{L})=0.0001230$ 18; $\alpha(\text{M})=1.83\times 10^{-5}$ 3 $\alpha(\text{N}+..)=1.178\times 10^{-6}$ B(E2)(W.u.)= 1.2×10^3 +6-3
4836.97	8 ⁺	776.6 1 692.9 1 783.3 2 1141.0 2	20.2 7 5.69 19 18.2 6 100 3	3882.95 6 ⁻ 4144.07 6 ⁺ 4053.72 7 ⁻ 3695.94 6 ⁺	E2		0.000264 4		I_γ : Other: 13.2 10 in $^{58}\text{Ni}(^{12}\text{C}, 2p\gamma)$. $\alpha(\text{K})=0.000233$ 4; $\alpha(\text{L})=2.38\times 10^{-5}$ 4; $\alpha(\text{M})=3.56\times 10^{-6}$ 5; $\alpha(\text{N}+..)=2.73\times 10^{-6}$ 4 B(E2)(W.u.)=14 3 δ : $\delta(\text{M3/E2})=0.0$ 1 from $\gamma(\theta)$ in $^{66}\text{Zn}(\alpha, 2n\gamma)$.
4877.7		2229.0 @ 10	100 @	2648.67 3 ⁻					
4957.40	8 ⁻	903.7 2 1074.4 10	41 11 100 3	4053.72 7 ⁻ 3882.95 6 ⁻	E2		0.000299 5		I_γ : Other: 14.7 21 in $^{58}\text{Ni}(^{12}\text{C}, 2p\gamma)$. $\alpha(\text{K})=0.000267$ 4; $\alpha(\text{L})=2.74\times 10^{-5}$ 4; $\alpha(\text{M})=4.08\times 10^{-6}$ 6; $\alpha(\text{N}+..)=2.67\times 10^{-7}$ 4 B(E2)(W.u.)=19 +5-9 E_γ, I_γ : from $^{58}\text{Ni}(^{12}\text{C}, 2p\gamma)$.
4999? 5049.58	8 ⁺	1303.0 212.6 1 905.5 1 995.9 10 1353.6 2	100 3.32 12 20.6 7 7.2 3 100 3	3695.94 6 ⁺ 4836.97 8 ⁺ 4144.07 6 ⁺ 4053.72 7 ⁻ 3695.94 6 ⁺	E2		0.000221 3		$\alpha(\text{K})=0.0001611$ 23; $\alpha(\text{L})=1.640\times 10^{-5}$ 23; $\alpha(\text{M})=2.45\times 10^{-6}$ 4 $\alpha(\text{N}+..)=4.11\times 10^{-5}$ 6 B(E2)(W.u.)=12 +4-5

Adopted Levels, Gammas (continued)

$\gamma(^{68}\text{Ge})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	α	Comments	
5148.69	(8 ⁻)	489.1 10 695.4 & 1095.0 2 1265.7 1	7.4 3 100 3 15.7 7	4659.46 7 ⁻ 4453.89 7 ⁻ 4053.72 7 ⁻ 3882.95 6 ⁻					
5266.6	7 ⁺	1591.2 10	100	3675.34 5 ⁺					
5330.11	9 ⁻	1276.4 1	100	4053.72 7 ⁻		E2	0.000227 4	$\alpha(\text{K})=0.000183$ 3; $\alpha(\text{L})=1.86\times 10^{-5}$ 3; $\alpha(\text{M})=2.78\times 10^{-6}$ 4; $\alpha(\text{N}+..)=2.30\times 10^{-5}$ 4 $\text{B}(\text{E}2)(\text{W.u.})=15$ +3-5	
5366.08	8 ⁺	316.5 1 1222.0 1 1670.1 2	11.5 7 70 27 100 4	5049.58 8 ⁺ 4144.07 6 ⁺ 3695.94 6 ⁺		E2	0.000275 4	$\alpha(\text{K})=0.0001055$ 15; $\alpha(\text{L})=1.070\times 10^{-5}$ 15; $\alpha(\text{M})=1.597\times 10^{-6}$ 23 $\alpha(\text{N})=1.051\times 10^{-7}$ 15 $\text{B}(\text{E}2)(\text{W.u.})=1.8$ +6-7	
5678.02	9 ⁻	347.9 1 720.6 1 1224.1 2	14.0 4 14.7 5 100 3	5330.11 9 ⁻ 4957.40 8 ⁻ 4453.89 7 ⁻		E2	0.000236 4	$\alpha(\text{K})=0.000200$ 3; $\alpha(\text{L})=2.04\times 10^{-5}$ 3; $\alpha(\text{M})=3.04\times 10^{-6}$ 5; $\alpha(\text{N})=1.99\times 10^{-7}$ 3 $\alpha(\text{N}+..)=1.262\times 10^{-5}$ 18 $\text{B}(\text{E}2)(\text{W.u.})=19$ 8	
5821.61	9 ⁻	1624.3 2 491.5 2 672.9 1 985.1 10 1162.9 10	4 4 66.6 20 34.4 10 24 10 100 3	4053.72 7 ⁻ 5330.11 9 ⁻ 5148.69 (8 ⁻) 4836.97 8 ⁺ 4659.46 7 ⁻				I_γ : Other: 36 4 in $^{58}\text{Ni}(^{12}\text{C}, 2\text{p}\gamma)$.	
5873.98	9 ⁺	1037.0 2	100	4836.97 8 ⁺					
5961.49	10 ⁺	631.4 2 1124.5 2	5.43 17 100 3	5330.11 9 ⁻ 4836.97 8 ⁺		E2	0.000271 4	$\alpha(\text{K})=0.000241$ 4; $\alpha(\text{L})=2.46\times 10^{-5}$ 4; $\alpha(\text{M})=3.68\times 10^{-6}$ 6; $\alpha(\text{N})=2.41\times 10^{-7}$ 4 $\alpha(\text{N}+..)=1.85\times 10^{-6}$ 3 $\text{B}(\text{E}2)(\text{W.u.})=24$ +5-7 δ : 0.0 1 from $\gamma(\theta)$ in $^{66}\text{Zn}(\alpha, 2\text{n}\gamma)$ (1977Mo20).	
6214.89	10 ⁺	848.5 10 1165.3 2	3.24 14 100 3	5366.08 8 ⁺ 5049.58 8 ⁺		E2	0.000253 4	$\alpha(\text{K})=0.000223$ 4; $\alpha(\text{L})=2.27\times 10^{-5}$ 4; $\alpha(\text{M})=3.39\times 10^{-6}$ 5; $\alpha(\text{N})=2.22\times 10^{-7}$ 4 $\alpha(\text{N}+..)=4.62\times 10^{-6}$ 7 $\text{B}(\text{E}2)(\text{W.u.})>19$	
6420.36	10 ⁻	1377.9 1 1463.0 2	18.7 6 100	4836.97 8 ⁺ 4957.40 8 ⁻					
6556.52	(10) ⁻	1226.4 & 1 1407.8 1	100	5330.11 9 ⁻ 5148.69 (8 ⁻)					
6595.71	10 ⁺	1229.6 1 1759.4 @ 10	100 3 28 28	5366.08 8 ⁺ 4836.97 8 ⁺					
6663.81	10 ⁺	789.82 7	100	5873.98 9 ⁺					

Adopted Levels, Gammas (continued)

$\gamma(^{68}\text{Ge})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	α	Comments	
6671.10?		1305.0 & 1	100	5366.08	8 ⁺				
7044.83	11 ⁻	1714.7 2	100	5330.11	9 ⁻	E2	0.000289 4	$\alpha(\text{K})=0.0001003$ 14; $\alpha(\text{L})=1.016\times 10^{-5}$ 15; $\alpha(\text{M})=1.517\times 10^{-6}$ 22 $\alpha(\text{N})=9.99\times 10^{-8}$ 14 $\text{B(E2)}(\text{W.u.})=2.3$ +7-10	
7145.30	11 ⁻	588.0 @ 10 1467.2 2	2.82 13 100 4	6556.52 (10) ⁻ 5678.02 9 ⁻		E2	0.000227 4	$\alpha(\text{K})=0.0001364$ 20; $\alpha(\text{L})=1.387\times 10^{-5}$ 20; $\alpha(\text{M})=2.07\times 10^{-6}$ 3 $\alpha(\text{N}+..)=7.43\times 10^{-5}$ 1	
7242.1?	(10 ⁺)	1876.0 &	100	5366.08	8 ⁺	(E2)	0.000345 5	$\alpha(\text{K})=8.45\times 10^{-5}$ 12; $\alpha(\text{L})=8.56\times 10^{-6}$ 12; $\alpha(\text{M})=1.277\times 10^{-6}$ 18 $\alpha(\text{N}+..)=0.000251$ 4 $\text{B(E2)}(\text{W.u.})=2.1$ +12-21 E_γ, I_γ : from $^{58}\text{Ni}(^{12}\text{C}, 2p\gamma)$.	
7251.12	11 ⁻	694.6 1 1289.6 1 1429.5 1 1573.1 3 1921.0 2	13.5 5 38 5 100 3 50.4 15 5.08 19	6556.52 (10) ⁻ 5961.49 10 ⁺ 5821.61 9 ⁻ 5678.02 9 ⁻ 5330.11 9 ⁻					
7371.21	12 ⁺	1409.7 2	100	5961.49	10 ⁺	E2	0.000221 4	$\alpha(\text{K})=0.0001481$ 21; $\alpha(\text{L})=1.506\times 10^{-5}$ 21; $\alpha(\text{M})=2.25\times 10^{-6}$ 4 $\alpha(\text{N}+..)=5.61\times 10^{-5}$ 8 $\text{B(E2)}(\text{W.u.})=9$ +18-7	
7495.95	(11 ⁻)	1077.1 10 1817.9 2	28.7 15 100 3	6420.36 10 ⁻ 5678.02 9 ⁻					
7516.89	12 ⁺	1302.0 1	100	6214.89	10 ⁺				
7532.5	12 ⁺	1571.0 10	100	5961.49	10 ⁺				
7559.38	12 ⁺	963.1 10 1344.4 2	5.86 21 100 3	6595.71 10 ⁺ 6214.89 10 ⁺		E2	0.000221 3	$\alpha(\text{K})=0.0001635$ 23; $\alpha(\text{L})=1.664\times 10^{-5}$ 24; $\alpha(\text{M})=2.48\times 10^{-6}$ 4 $\alpha(\text{N}+..)=3.88\times 10^{-5}$ 6 $\text{B(E2)}(\text{W.u.})=8$ +9-3	
7761.85	12 ⁺	1597.9 2 202.5 1 245.0 1 1800.4 2	18.1 5 20.4 7 9.2 4 100 3	5961.49 10 ⁺ 7559.38 12 ⁺ 7516.89 12 ⁺ 5961.49 10 ⁺					
7881.5?		1920.0 & 10	100	5961.49	10 ⁺				
8043.38	13 ⁺	281.5 1 672.2 1 723.3 10	18.4 7 100 3 40 11	7761.85 12 ⁺ 7371.21 12 ⁺ 7320.1? (12 ⁺)					
8171.94	13 ⁻	410.5 2 612.5 & 1 655.0 1 676.0 1	3.27 11 6.70 19 3.24 11	7761.85 12 ⁺ 7559.38 12 ⁺ 7516.89 12 ⁺ 7495.95 (11 ⁻)					

Adopted Levels, Gammas (continued)

$\gamma(^{68}\text{Ge})$ (continued)								
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	α	Comments
8171.94	13 ⁻	800.7 <i>I</i> 920.8 <i>I</i>	13.7 <i>4</i> 100 <i>3</i>	7371.21 7251.12	12 ⁺ 11 ⁻	E2	0.000432 <i>6</i>	$\alpha(\text{K})=0.000386$ <i>6</i> ; $\alpha(\text{L})=3.96\times 10^{-5}$ <i>6</i> ; $\alpha(\text{M})=5.91\times 10^{-6}$ <i>9</i> ; $\alpha(\text{N})=3.85\times 10^{-7}$ <i>6</i> $\alpha(\text{N}+..)=3.85\times 10^{-7}$ <i>6</i> Mult.: from $\gamma(\theta)$ and $\gamma(\text{lin pol})$ in (HI,xn γ).
		1026.6 <i>I</i> 1127.1 <i>I</i>	39.6 <i>14</i> 22.8 <i>7</i>	7145.30 7044.83	11 ⁻ 11 ⁻			
8621.5?		1062.1 & <i>10</i>	100	7559.38	12 ⁺			
8660.57	14 ⁺	898.7 <i>I</i> 1101.2 <i>I</i> 1143.7 <i>I</i>	25.0 <i>8</i> 100 <i>3</i> 45.6 <i>14</i>	7761.85 7559.38 7516.89	12 ⁺ 12 ⁺ 12 ⁺			
8663.3?		1618.5 & <i>10</i>	100	7044.83	11 ⁻			
8781.4?		1736.5 & <i>10</i>	100	7044.83	11 ⁻			
8790.26	15 ⁻	618.3 <i>I</i>	100	8171.94	13 ⁻	E2	0.001246 <i>18</i>	$\alpha(\text{K})=0.001112$ <i>16</i> ; $\alpha(\text{L})=0.0001158$ <i>17</i> ; $\alpha(\text{M})=1.726\times 10^{-5}$ <i>25</i> $\alpha(\text{N})=1.110\times 10^{-6}$ <i>16</i> Mult.: from $\gamma(\theta)$ in $^{40}\text{Ca}(^{32}\text{S},4\text{p}\gamma)$.
8868.18	14 ⁻	696.0 <i>10</i> 824.8 <i>I</i>	100 <i>3</i> 48.8 <i>18</i>	8171.94 8043.38	13 ⁻ 13 ⁺			
8930.9?	(14 ⁺)	1559.7 &	100	7371.21	12 ⁺			
9012.1	14 ⁺	1452.6 @ <i>10</i> 1495.2 @ <i>10</i>	14.5 <i>5</i> 100 <i>3</i>	7559.38 7516.89	12 ⁺ 12 ⁺			
9112.5	14 ⁺	1068.8 <i>10</i> 1595.0 <i>10</i>	100 <i>4</i> 47.6 <i>21</i>	8043.38 7516.89	13 ⁺ 12 ⁺			
9170.0	14 ⁺	1410.0 & 1798.1 <i>10</i>	100	7761.85 7371.21	12 ⁺ 12 ⁺	E2	0.000317 <i>5</i>	$\alpha(\text{K})=9.16\times 10^{-5}$ <i>13</i> ; $\alpha(\text{L})=9.27\times 10^{-6}$ <i>13</i> ; $\alpha(\text{M})=1.384\times 10^{-6}$ <i>20</i> $\alpha(\text{N}+..)=0.000215$ <i>3</i> B(E2)(W.u.)=4.6 <i>23</i>
9386.56	15 ⁽⁻⁾	596.1 <i>10</i> 1214.6 <i>I</i>	20.0 <i>6</i> 100 <i>4</i>	8790.26 8171.94	15 ⁻ 13 ⁻			
9418.9	14 ⁺	1886.4 <i>10</i>	100	7532.5	12 ⁺			
9563.9	15 ⁽⁻⁾	904.0 <i>10</i>	100	8660.57	14 ⁺			
9605.7	15 ⁺	945.4 <i>10</i> 1562.1 <i>10</i>	73.6 <i>23</i> 100 <i>3</i>	8660.57 8043.38	14 ⁺ 13 ⁺			
10024.58?		854.4 & <i>10</i> 1364.0 & <i>I</i>	100	9170.0 8660.57	14 ⁺ 14 ⁺			
10126.6	16 ⁽⁻⁾	1336.7 <i>10</i>	100	8790.26	15 ⁻			
10217.53	16 ⁺	1425.8 <i>10</i> 1557.0 <i>2</i>	14.7 <i>6</i> 100 <i>3</i>	8790.26 8660.57	15 ⁻ 14 ⁺			

Adopted Levels, Gammas (continued)

$\gamma(^{68}\text{Ge})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π
10295.51	17 ⁽⁻⁾	908.5 10	5.17 17	9386.56	15 ⁽⁻⁾	12246.0	18 ⁺	1949.5 10	38.4 14	10295.51	17 ⁽⁻⁾
		1505.2 2	100 3	8790.26	15 ⁻	12262.5	(18 ⁻)	1967.0 10	100	10295.51	17 ⁽⁻⁾
10493.4	16 ⁽⁻⁾	1106.4 10	40.4 18	9386.56	15 ⁽⁻⁾	12363.4	(19 ⁻)	1436.7 10	100 3	10927.0	17 ⁽⁻⁾
		1625.7 10	70.8 23	8868.18	14 ⁻			2067.4 10	54 18	10295.51	17 ⁽⁻⁾
		1702.9 10	100 4	8790.26	15 ⁻	12501.8?		1837.8 & 10	100	10664.0	16 ⁺
10664.0	16 ⁺	1651.7 @ 10	100	9012.1	14 ⁺	12535.8?		2318.2 & 10	100	10217.53	16 ⁺
10665.6	17 ⁽⁻⁾	369.2 10	16.0 6	10295.51	17 ⁽⁻⁾	12641.7	(18 ⁺)	1224.9 10	1.0×10 ² 17	11417.4	16 ⁺
		1278.8 10	100 3	9386.56	15 ⁽⁻⁾			1555.5 10	1.0×10 ² 17	11085.6	16 ⁺
10688.8?		1898.5 & 10	100	8790.26	15 ⁻	12652.3	(18 ⁻)	2525.6 10	100	10126.6	16 ⁽⁻⁾
10896.0	16 ⁺	1727.3 10	100 4	9170.0	14 ⁺	12719.4	18 ⁺	1633.8 10	100	11085.6	16 ⁺
		2105.8 10	93 4	8790.26	15 ⁻	12779.1?		2115.1 & 10	100	10664.0	16 ⁺
10897.0?		1884.8 & 10	100	9012.1	14 ⁺	12817.2	19 ⁺	1274.5 10	100 16	11542.7?	(17 ⁺)
10927.0	17 ⁽⁻⁾	631.4 10	9.1 7	10295.51	17 ⁽⁻⁾			1827.4 10	81 16	10989.8	17 ⁺
		800.8 10	50.0 16	10126.6	16 ⁽⁻⁾	12884.1?		2220.1 & 10	100	10664.0	16 ⁺
		1363.8 10	99 3	9563.9	15 ⁽⁻⁾	13104.3?		2808.7 & 10	100	10295.51	17 ⁽⁻⁾
		1540.4 10	100 3	9386.56	15 ⁽⁻⁾	13265.3?		2969.7 & 10	100	10295.51	17 ⁽⁻⁾
		2136.2 10	53 26	8790.26	15 ⁻	13617.4?		1623.0 & 10	100	11994.4	18 ⁺
10957.9	16 ⁺	1845.0 10	100	9112.5	14 ⁺	13751.3?		3455.7 & 10	100	10295.51	17 ⁽⁻⁾
10988.1	16 ⁺	1875.2 10	94 3	9112.5	14 ⁺	13953.0	20 ⁺	1707.0 10	100	12246.0	18 ⁺
		1975.8 10	100 4	9012.1	14 ⁺	13991.0?		1996.6 & 10	100	11994.4	18 ⁺
		2328.1 10	42.5 20	8660.57	14 ⁺	14085.5	(20 ⁻)	1823.0 10	40 50	12262.5	(18 ⁻)
10989.8	17 ⁺	1384.0 10	100	9605.7	15 ⁺			1921.0 10	20.7 10	12165.0	(19 ⁻)
10990.0	16 ⁺	1820.0 10	100	9170.0	14 ⁺			1948.0 10	100 3	12136.9	19 ⁽⁻⁾
11085.6	16 ⁺	1666.0 10	100	9418.9	14 ⁺	14116.5	20 ⁺	2122.0 10	100	11994.4	18 ⁺
11406.4?		2616.1 & 10	100	8790.26	15 ⁻	14360.9?		2224.0 & 10	100	12136.9	19 ⁽⁻⁾
11417.4	16 ⁺	1999.0 10	100	9418.9	14 ⁺	14401.9	21 ⁽⁻⁾	2265.0 10	100	12136.9	19 ⁽⁻⁾
11793.4?		1666.8 & 10	100	10126.6	16 ⁽⁻⁾	14485.6	(21 ⁻)	2122.1 10	100 23	12363.4	(19 ⁻)
11794.2?	(19 ⁻)	1498.7 10	100	10295.51	17 ⁽⁻⁾			2348.7 10	27 23	12136.9	19 ⁽⁻⁾
11832.2	(20 ⁻)	1536.7 10	100	10295.51	17 ⁽⁻⁾	14504.9	21 ⁺	1687.7 10	100	12817.2	19 ⁺
11994.4	18 ⁺	1006.4 10	36.0 10	10988.1	16 ⁺	15562.8	22 ⁺	1446.3 10	100	14116.5	20 ⁺
		1036.3 10	14.4 6	10957.9	16 ⁺	15835.1	22 ⁺	1882.0 10	100	13953.0	20 ⁺
		1330.5 10	15.6 6	10664.0	16 ⁺	16130.5	22 ⁽⁻⁾	1703.9 10	39.0 14	14426.6?	(21)
		1776.9 10	100 11	10217.53	16 ⁺			2045.0 10	100 3	14085.5	(20 ⁻)
12136.9	19 ⁽⁻⁾	1470.0 10	32.0 10	10665.6	17 ⁽⁻⁾	16733.9	23 ⁺	2229.0 10	100	14504.9	21 ⁺
		1841.32 4	100 3	10295.51	17 ⁽⁻⁾	17360.5?		2855.5 & 10	100	14504.9	21 ⁺
12165.0	(19 ⁻)	1870.0 10	100	10295.51	17 ⁽⁻⁾	17496.0	23 ⁽⁻⁾	3094.0 10	100	14401.9	21 ⁽⁻⁾
12246.0	18 ⁺	1287.8 10	57 3	10957.9	16 ⁺	18022.1	24 ⁺	2187.0 10	100	15835.1	22 ⁺
		1351.3 10	65.3 20	10896.0	16 ⁺	18132.5	24 ⁽⁻⁾	2002.0 10	100	16130.5	22 ⁽⁻⁾
		1581.9 10	100 3	10664.0	16 ⁺	18274.1		2439.0 10	100	15835.1	22 ⁺

Adopted Levels, Gammas (continued)

$\gamma(^{68}\text{Ge})$ (continued)

<u>E_i(level)</u>	<u>J_i^{π}</u>	<u>E_{γ}[†]</u>	<u>I_{γ}[†]</u>	<u>E_f</u>	<u>J_f^{π}</u>	<u>E_i(level)</u>	<u>J_i^{π}</u>	<u>E_{γ}[†]</u>	<u>I_{γ}[†]</u>	<u>E_f</u>	<u>J_f^{π}</u>
19785.0	25 ⁺	3051.0 <i>10</i>	100	16733.9	23 ⁺	3425.0+x	(18)	1850.0 ^{&} <i>10</i>		1575.0+x?	(16)
20356.6	26 ⁽⁻⁾	2224.0 <i>10</i>	100	18132.5	24 ⁽⁻⁾	5440.1+x	(20)	2015.0 <i>10</i>	100	3425.0+x	(18)
20821.2	26 ⁺	2799.0 <i>10</i>	100	18022.1	24 ⁺	7677.1+x	(22)	2237.0 <i>10</i>	100	5440.1+x	(20)
22958.6	28 ⁽⁻⁾	2602.0 <i>10</i>	100	20356.6	26 ⁽⁻⁾	10126.2+x	(24)	2449.0 <i>10</i>	100	7677.1+x	(22)
1620.0+x	(16)	1620.0 <i>10</i>	100	x	(14)	12815.2+x	(26)	2689.0 <i>10</i>	100	10126.2+x	(24)
3425.0+x	(18)	1805.0 <i>10</i>		1620.0+x	(16)						

† From (HI,xn γ), except where noted.

‡ From $\gamma(\theta)$ in ⁵⁸Ni(¹²C,2p γ) ([1981De03](#)), except where noted.

From γ linear polarization in ⁶³Cu(⁷Li,2n γ) ([1981De03](#)).

@ From ⁶⁸As ε decay (151.6 s).

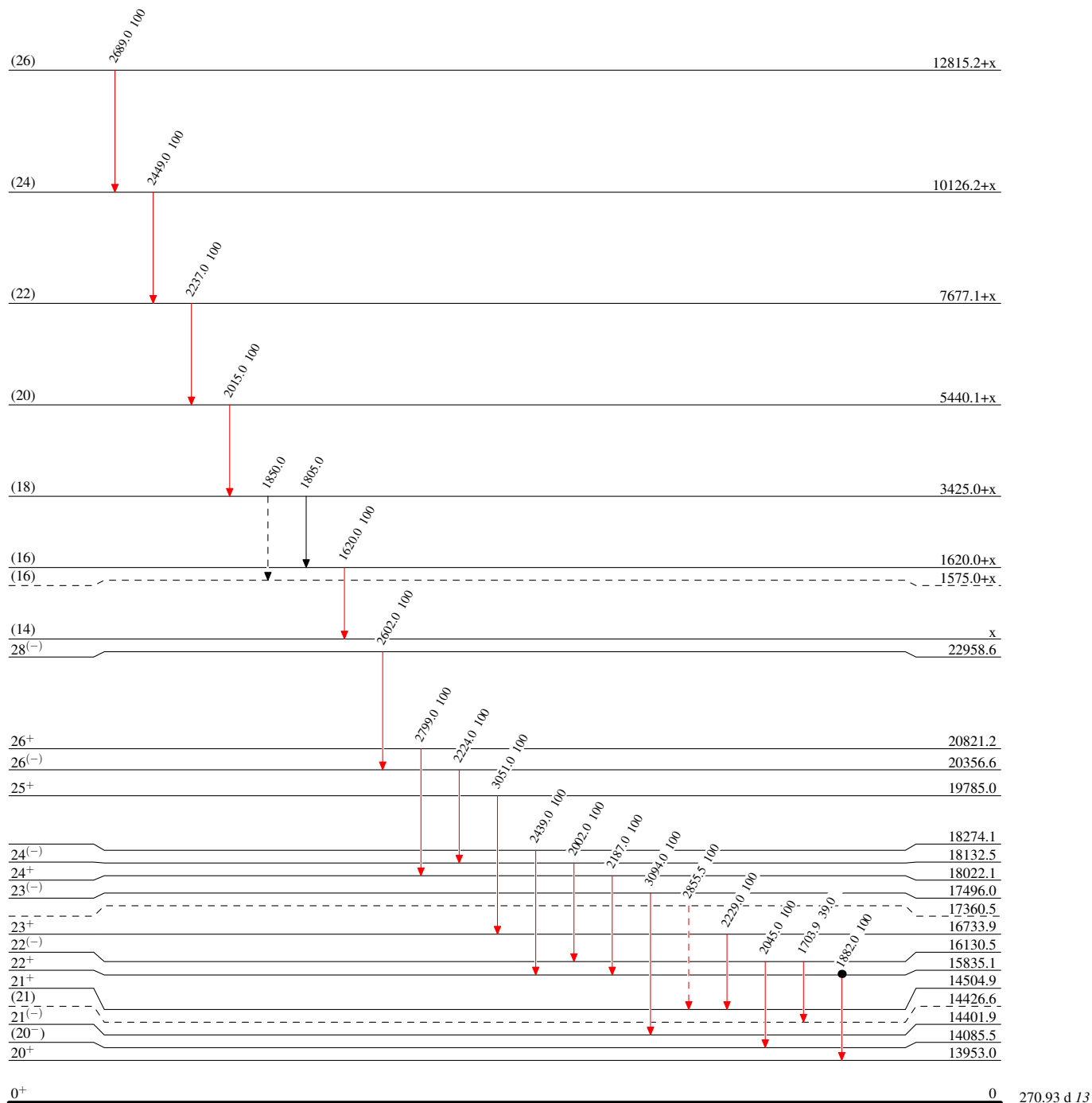
& Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas**Level Scheme**

Intensities: Type not specified

Legend

- $I_\gamma < 2\% \times I_\gamma^{\max}$
- $I_\gamma < 10\% \times I_\gamma^{\max}$
- $I_\gamma > 10\% \times I_\gamma^{\max}$
- - - - -→ γ Decay (Uncertain)
- Coincidence

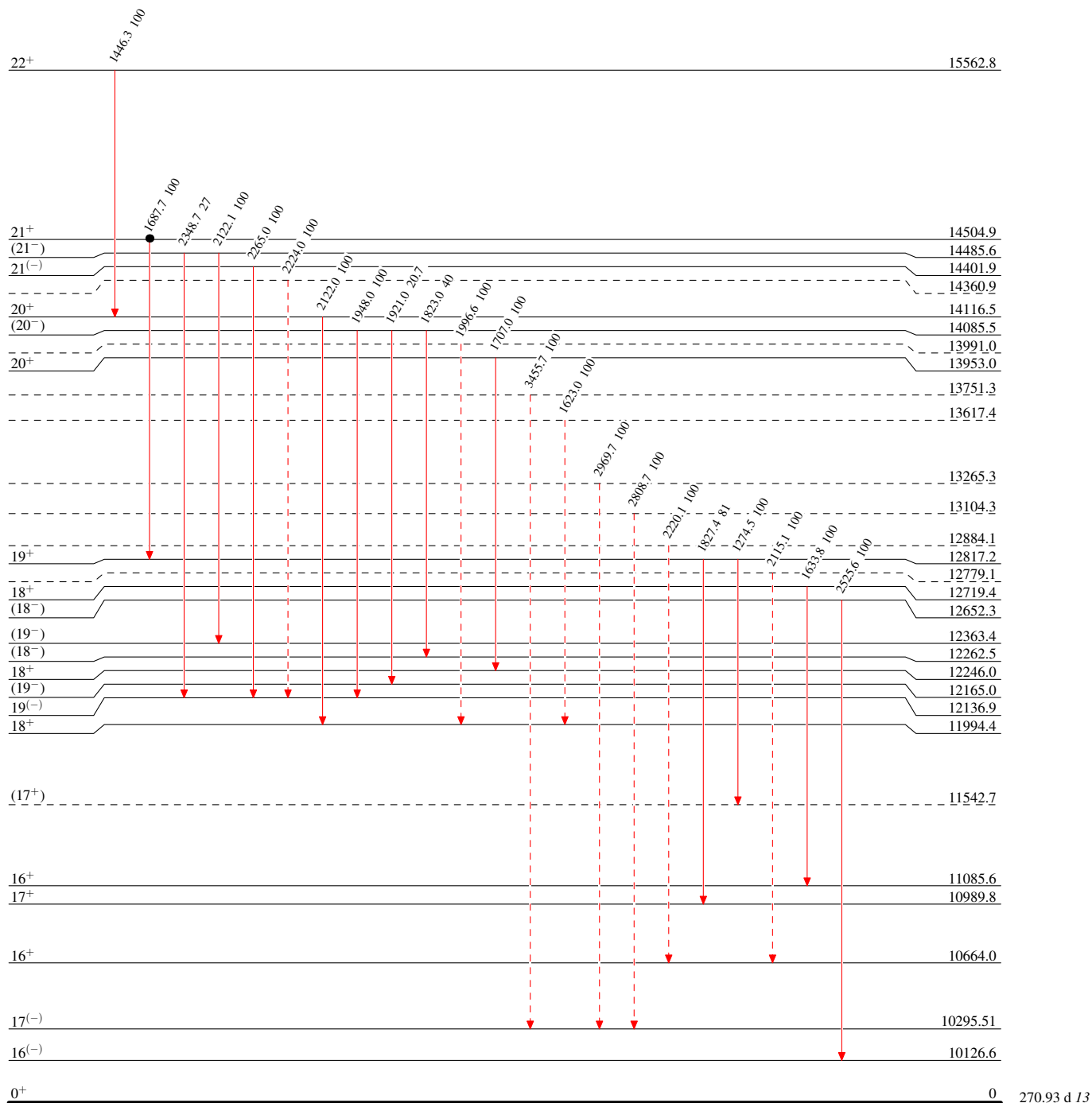


Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Type not specified

Legend

- $I_\gamma < 2\% \times I_\gamma^{\max}$
- $I_\gamma < 10\% \times I_\gamma^{\max}$
- $I_\gamma > 10\% \times I_\gamma^{\max}$
- - - - -→ γ Decay (Uncertain)
- Coincidence



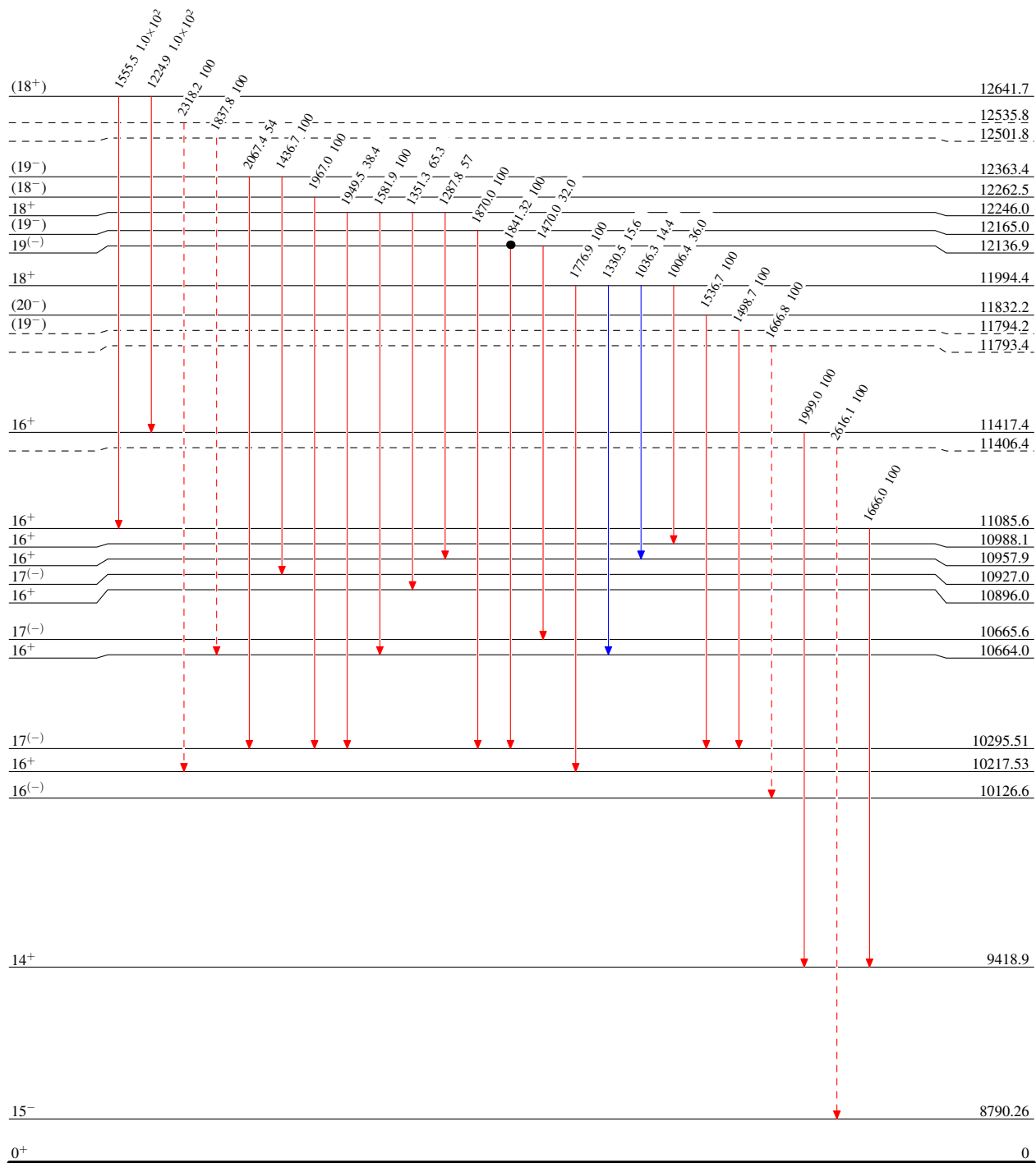
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

Legend

- $I_\gamma < 2\% \times I_\gamma^{\max}$
- $I_\gamma < 10\% \times I_\gamma^{\max}$
- $I_\gamma > 10\% \times I_\gamma^{\max}$
- - - - - γ Decay (Uncertain)
- Coincidence



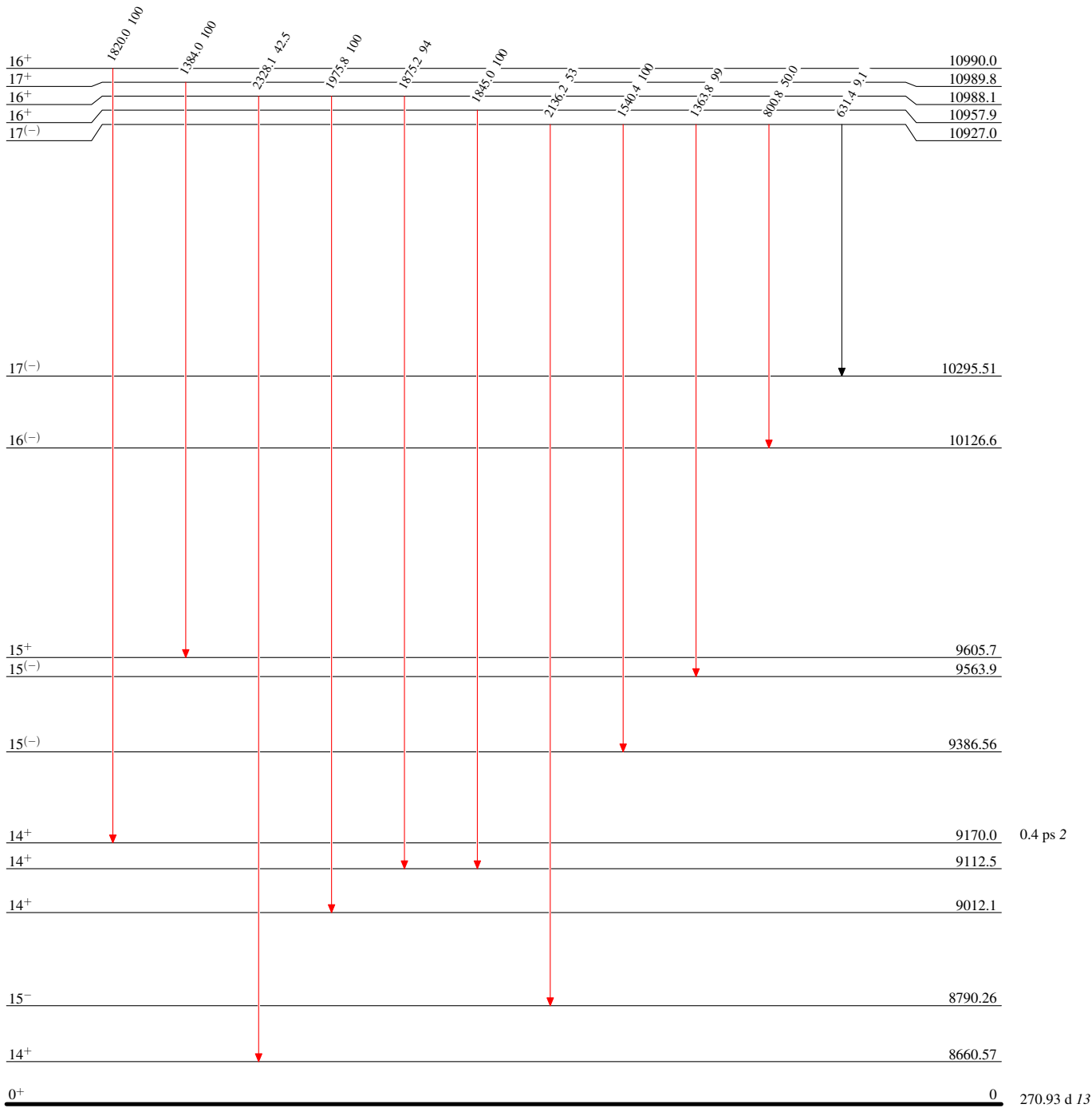
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$



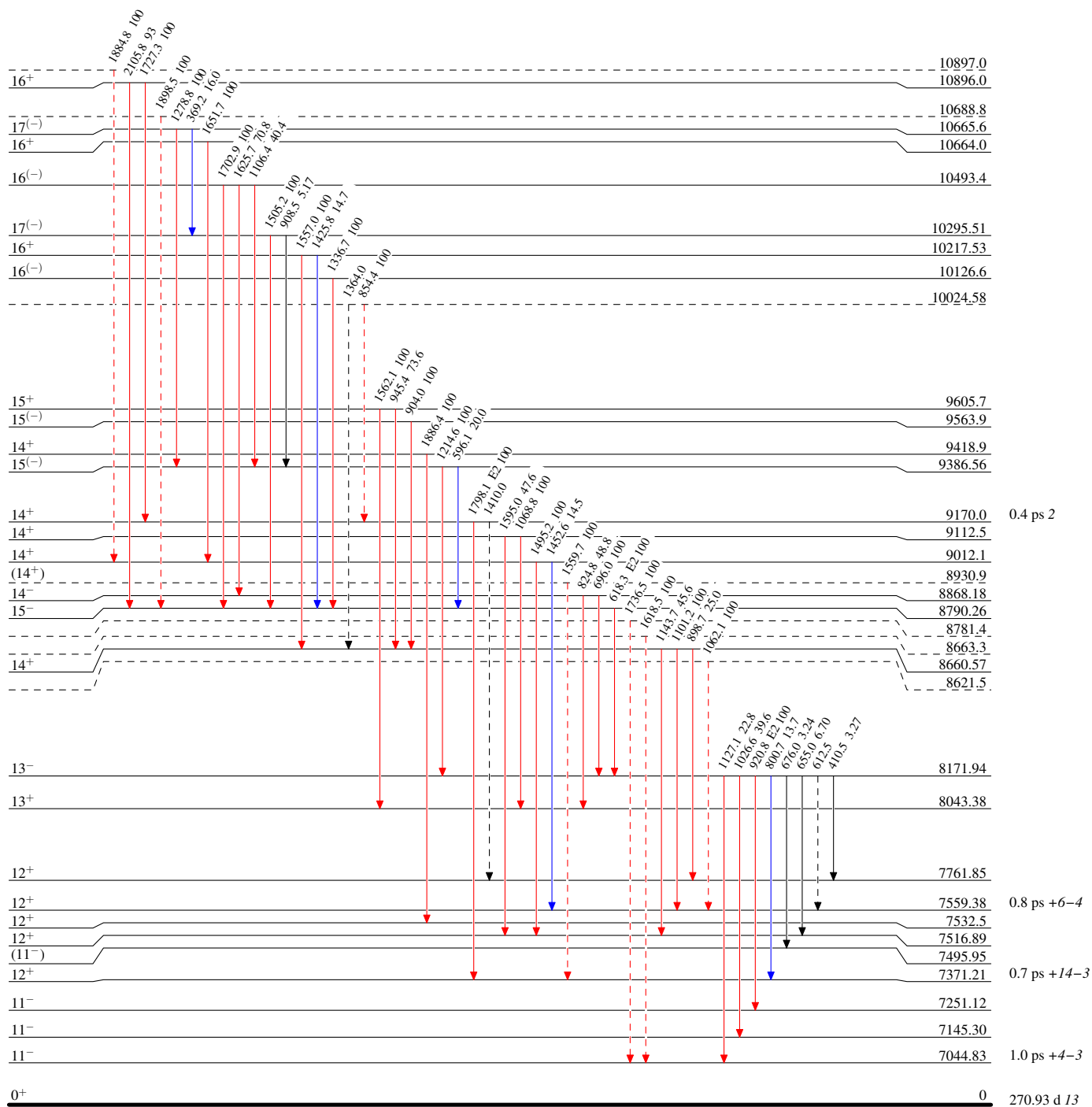
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Type not specified

- $\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ γ Decay (Uncertain)



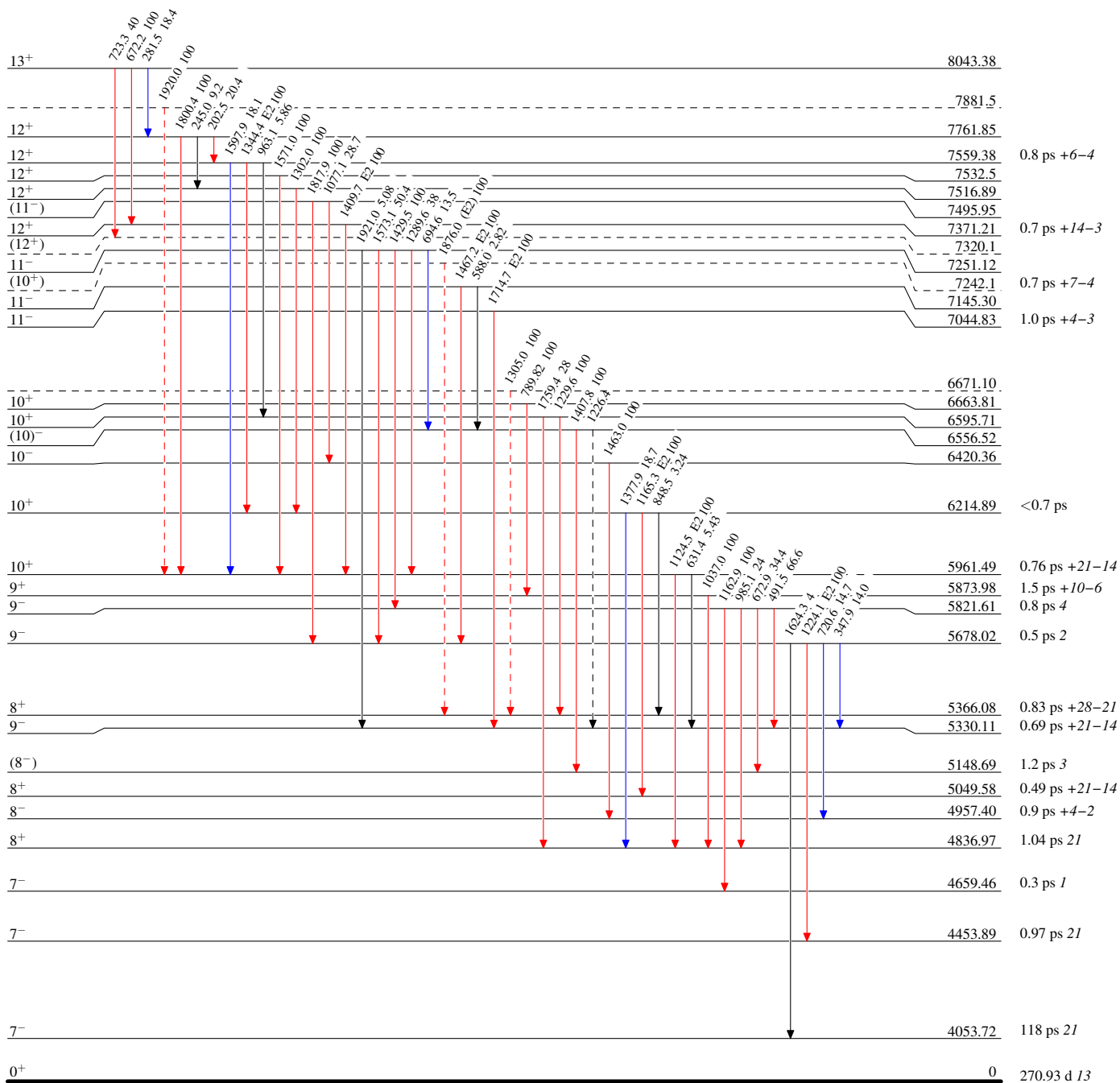
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

Legend

- $\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ γ Decay (Uncertain)



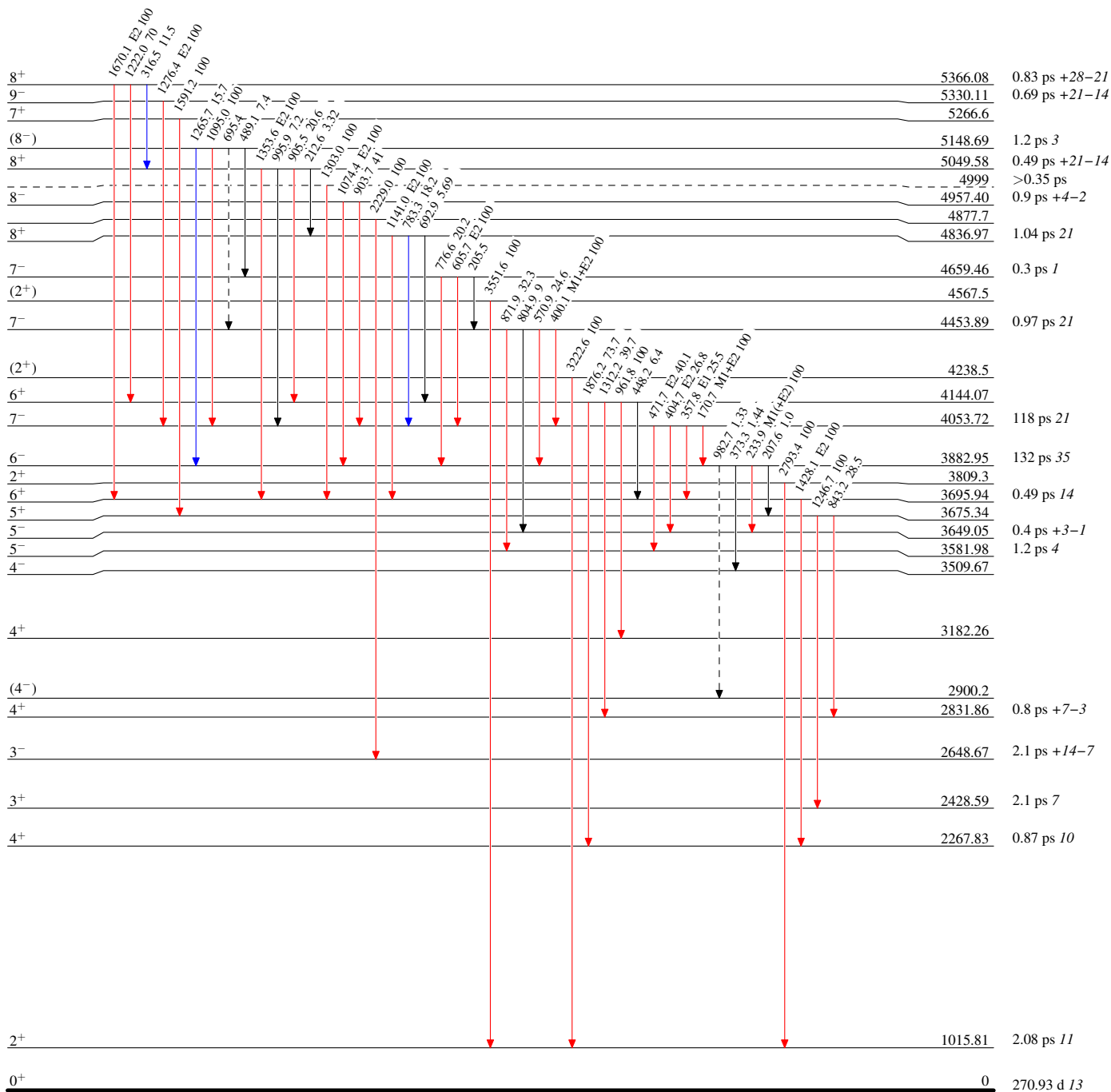
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Type not specified

- $I_\gamma < 2\% \times I_\gamma^{\max}$
 —→ $I_\gamma < 10\% \times I_\gamma^{\max}$
 —→ $I_\gamma > 10\% \times I_\gamma^{\max}$
 - - - - -→ γ Decay (Uncertain)



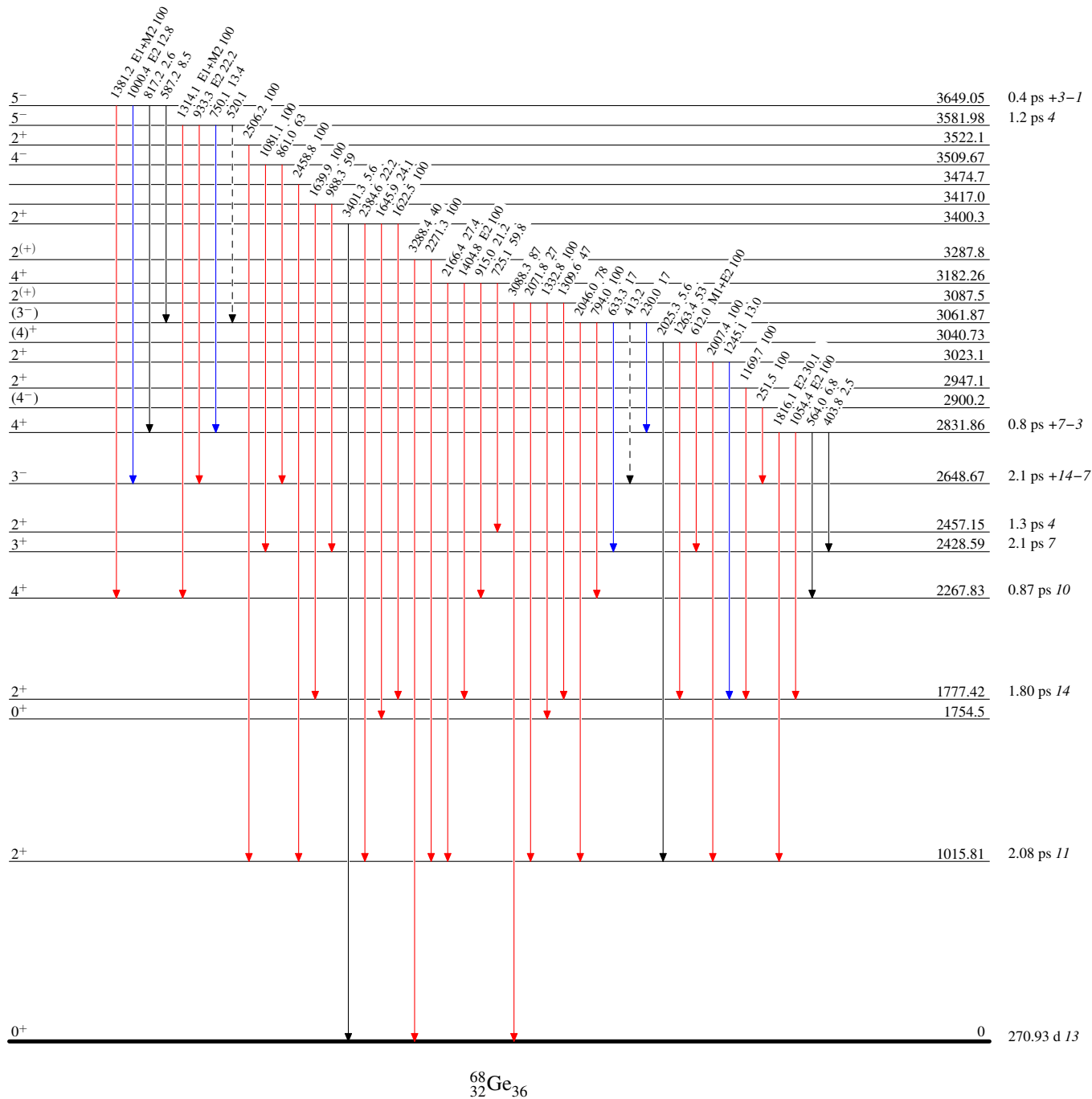
Adopted Levels, Gammas

Legend

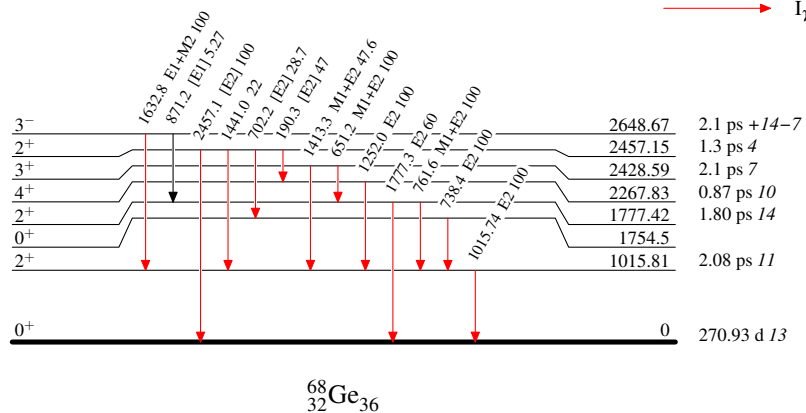
Level Scheme (continued)

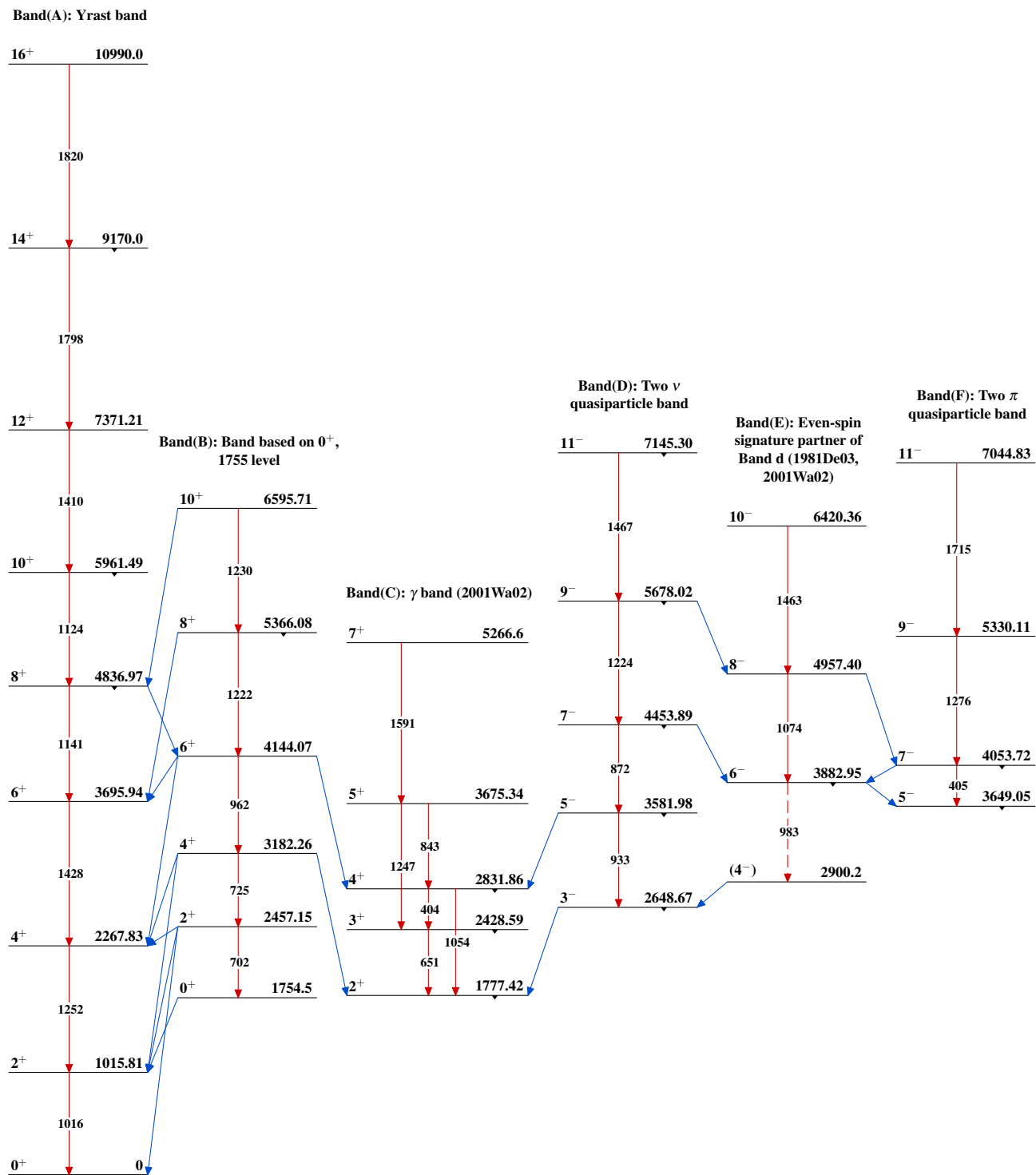
Intensities: Type not specified

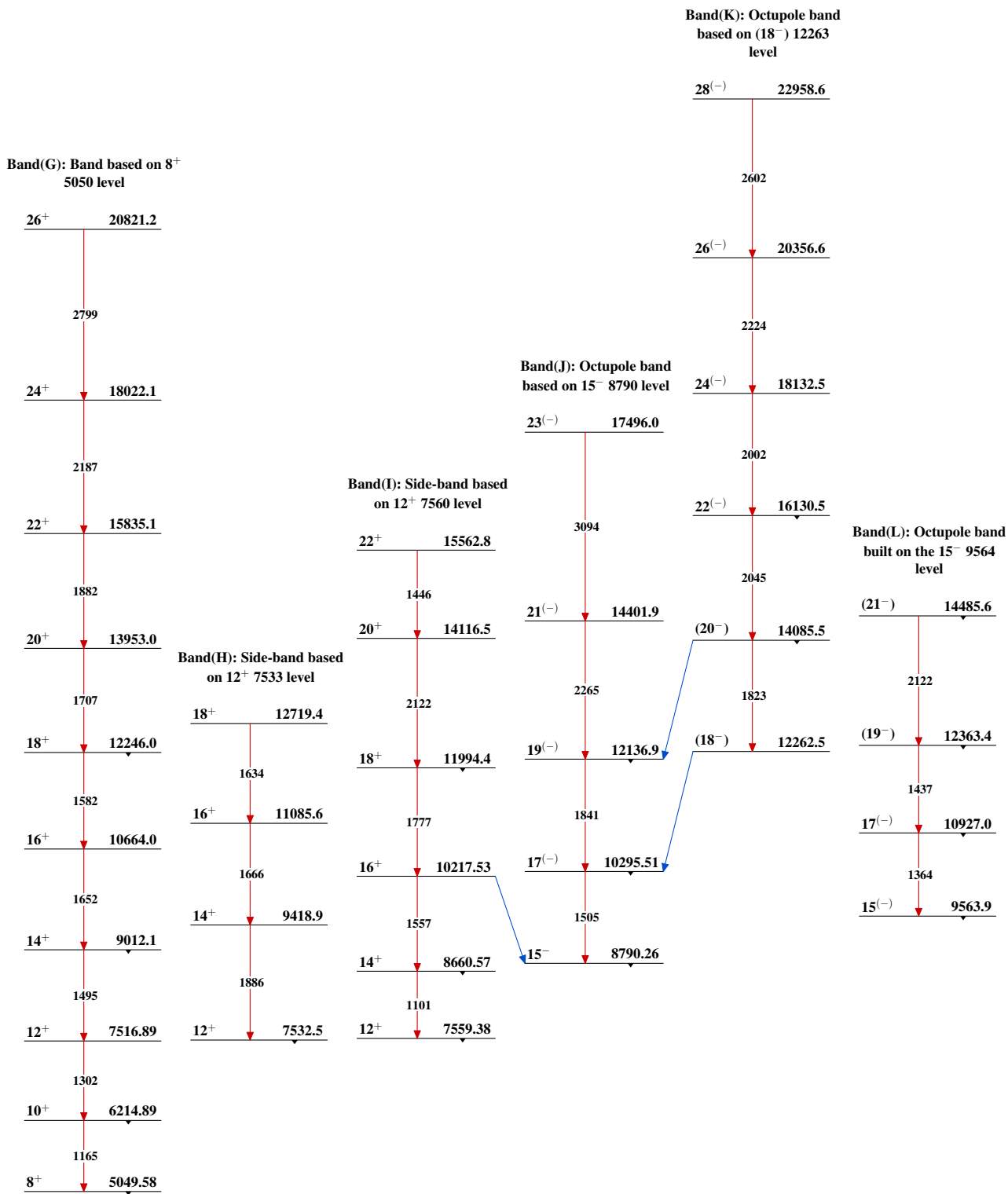
- $I_\gamma < 2\% \times I_\gamma^{\text{max}}$
- $I_\gamma < 10\% \times I_\gamma^{\text{max}}$
- $I_\gamma > 10\% \times I_\gamma^{\text{max}}$
- - - - -→ γ Decay (Uncertain)



$^{68}_{32}\text{Ge}_{36}$

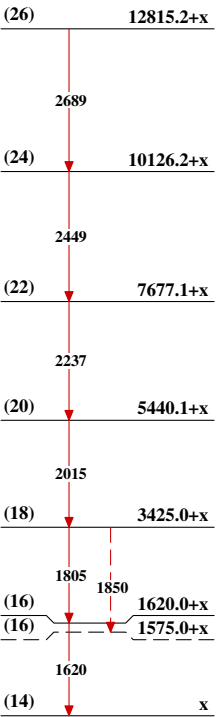


Adopted Levels, Gammas

Adopted Levels, Gammas (continued)

Adopted Levels, Gammas (continued)

Band(M): Super-deformed
band (2001Wa02)



Band(N): Band based on
13⁺ 8043 level

