Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 110, 1 (2009)	20-Nov-2008

Q(β^-)=−464 *3*; S(n)=7932 *6*; S(p)=4890.7 *6*; Q(α)=1964.5 *11* 2017Wa10
S(2n)=14354 *6*; S(2p)=13166.5 *6* 2017Wa10
Additional information 1.
Other reactions:
Giant dipole resonances and isobaric analog resonances: 1983Bo22, 1978Ba69, 1971Va12, 1969Be59, 1967Jo04, 1966Ba12.
Neutron resonances: 1972Ra22 report 105 resonances from 0.32 to 98.6 eV.
Nuclear structure references (levels, moments, etc.): 1994Jo09, 1992St01, 1986Be28, 1985Bh03.
Additional information 2.
Hyperfine structure, isotope shifts, etc.: 2008Ga03 (magnetic anomaly deduced between ^{151}Eu-^{152}Eu pair), 2004Ma04, 2002Ga49, 2001Ga72, 2000Ga35, 2000Tr07, 1997En09, 1994Vi10, 1993El09, 1993HuZU, 1993Mo04, 1992Vi02, 1992Kn03, 1992Ar25, 1991Pi11, 1991Kr17, 1991Kr05, 1991Ch43, 1990Se15, 1990AlZK, 1989Se11, 1988Kr05, 1987Br26, 1987Se12, 1987Fe08, 1987Hu14, 1987Se06, 1987Pf01, 1986Si23, 1985Ch13, 1984Al30, 1976Fu04, 1975Fu11, 1974Fu04, 1974En08.
Mass measurements: 2000Be42 (Penning-trap), 1975Ka25, 1972Ba08, 1970Ma05, 1968De17, 1968Gu02, 1967De20, 1963De30.

^{151}Eu Levels

Cross Reference (XREF) Flags

A	^{151}Sm β^- decay (90 y)	H	^{150}Sm(α,t)	O	^{152}Sm(p,2nγ) E=12-22 MeV
B	Muonic atom	I	^{151}Eu(γ,γ): Mossbauer	P	^{152}Sm(p,2nγ) E=18-28 MeV
C	^{151}Gd ε decay (123.9 d)	J	^{151}Eu(γ,γ')	Q	^{152}Sm(p,2nγ) E=18.8 MeV
D	^{136}Xe(^{19}F,4nγ)	K	^{151}Eu(n,n'γ)	R	^{152}Sm(d,3nγ)
E	^{148}Nd(^{6}Li,3nγ)	L	^{151}Eu(p,p')	S	^{152}Eu(d,t)
F	^{150}Nd(^{6}Li,5nγ)	M	^{151}Eu(d,d')	T	^{153}Eu(p,t)
G	^{150}Sm(^{3}He,d)	N	Coulomb excitation	U	^{154}Sm(p,4nγ)

E(level)†	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	5/2$^+$	≥1.7×10^{18} y	ABCDEFGHIJKLMNOPQRSTU	%α=? μ=+3.4717 *6* (1989Ra17,1965Ev08) Q=+0.903 *10* (1989Ra17,1984Ta04) β_2=0.12 (1984Ta04) $<r^2>^{1/2}$=5.053 fm *4* (2004An14 evaluation). J$^\pi$: spin from paramagnetic resonance method (1955Bl16,1957Ma19) and optical spectroscopy (1935Sc01). Parity from L(p,t)=0 from 5/2$^+$ target. T$_{1/2}$: from α decay search of ^{151}Eu by 2007Be48, low background CaF$_2$(Eu) crystal scintillator used at Gran Sasso Lab. The limiting value of the α-decay half-life is a conservative estimate since the uncertainties are large. Otherwise there is some indication of the the presence of α decay activity from T$_{1/2}$(^{151}Eu g.s. to g.s.)= 5×10^{18} y *+11−3* relative to the α decay of the daughter activity ^{147}Pm g.s. Configuration=$\pi d^{-1}_{5/2}$. μ: Atomic-beam method. Others: +3.474 *1* (1962Ba12,1964Bl22). Other references dealing with μ measurement: 1985Al06, 1981Ar25, 1970He09, 1969Ab12, 1964Ho22, 1961Pi07, 1960Kr07, 1960Pi10, 1960Sa23, 1957Kr51, 1957Ab05, 1935Sc01. See also 2005St24 compilation. Q: From muonic atoms. Others: +1.12 *7* (1968Gu02), +1.15 *9* (1965Wi09), 1.53 *5* (1981Br17), 1.32 (1981Ar25), +0.95 *3* (1985Ah02) 0.83 (1987Se12). Other references dealing with Q:

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Adopted Levels, Gammas (continued)

^{151}Eu Levels (continued)

E(level)†	J$^\pi$	T$_{1/2}$	XREF	Comments
				1993Mo04, 1992Vi02, 1985Al06, 1984Kr08, 1970He09, 1969Gu04, 1969Ab12, 1965Mu07, 1960Kr08. See also 2005St24 compilation. Additional information 3. Q(^{151}Eu)/Q(^{153}Eu)=0.37 *1* (1992Vi02), 0.374 *5* (1993Mo04). Q(^{153}Eu)/Q(^{151}Eu)=2.556 *5* (1986Si16). Ratio of Q′s from optically detected NMR (1986Si16). Others: 1985Sh29, 1981Er13. Ω(^{151}Eu)/Ω(^{153}Eu)=0.87 *6* (1991Ch43). Ω=octupole moment. General references containing information on μ and Q measurements: 1985Ga16, 1985Kr09, 1982Pf01, 1982Kr02, 1975La14, 1972Kr29, 1971Ku07, 1970Ki13. Δ<r^2>(^{151}Eu−^{153}Eu)=0.606 fm^2 *18* (1984Ta05, muonic atoms), 0.577 fm^2 *25* (1985Al06), 0.602 fm^2 *33* (1985Ah02), 0.591 fm*2 7 (1979Za03). The values from 1985Al06, 1985Ah02 and 1979Za03 are from LASER spectroscopy. 1984Al35, 1984Do11, 1983Do08 are from the same laboratory as 1985Al06. Others: 1952Br01, 1973Ry06.
21.541‡ *3*	7/2$^+$	9.6 ns *3*	ABCDEFGHIJKLMNOPQRSTU	μ=+2.591 *2* (1989Ra17,1972Cr09) Q=1.28 *2* (1989Ra17,1984Ta05) J$^\pi$: from Mossbauer spectroscopy (1963Ba39). Parity from M1+E2 γ to 5/2$^+$. Possible interpretation as a g7/2 state not found to be adequate (1984Ta05). T$_{1/2}$: $\gamma\gamma$(t) in ^{151}Gd ε decay. μ: Others: 1969St21, 1969Cr07, 1963No06, 1963Ba39. See also 2005St24 compilation of moments. Q: From muonic atoms. Others: +1.185 *22* (1989Ra17 quote a reanalyzed Mossbauer result), +1.54 *12* (1972Ch04), +1.47 *12* (1969St21), 1968St23, 1968NoZZ, 1963No06. See also 2005St24 compilation of moments. Δ<r^2>(isomer shift)=0.025 fm^2 *7* (1984Ta05, muonic atoms), +0.028 fm^2 (1968Ko27, Mossbauer), +0.030 fm^2 *10* (1964Br41, Mossbauer). Other: 1972Wa02.
196.245@ *10*	11/2$^-$	58.9 μs *5*	CDEFGH K NOPQRS U	%IT=100 J$^\pi$: M2 γ to 7/2$^+$; band assignment. T$_{1/2}$: weighted average of following results: from ^{151}Gd ε decay: 58.9 μs *7* ($\gamma\gamma$(t) 1994Si11), 58.8 μs *6* ($\gamma\gamma$(t) 1969FaZY), 58 μs *3* (γ(ce)(t) 1960Be27), 58 μs *10* (Xγ(t) 1958Sh61); from pulsed beam experiments: 62.7 μs *30* ((p,p′γ) 1967Co20), 66 μs *13*, 55 μs *11*, 75 μs *15* ((p,p′γ) and (α,α′γ) 1968Io01), 76 μs (1965Mc03). T$_{1/2}$: from $\gamma\gamma$(t) in ^{151}Gd ε decay. Others from γ(t) in (p,p′γ): 66 μs *14*, 55 μs *11* (1968Io01); 62.7 μs *30* (1967Co20); 76 μs (1965Mc03).
196.54 *3*	(3/2)$^+$	0.24 ns *4*	C KLMNOP R U	J$^\pi$: ΔJ=(1), E2+M1 γ to 5/2$^+$ and log *ft*>10 from 7/2$^-$. T$_{1/2}$: from centroid-shift in Coul. ex. (1972Th09).

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Adopted Levels, Gammas (continued)

^{151}Eu Levels (continued)

E(level)[†]	J$^\pi$	T$_{1/2}$	XREF	Comments
216.72 *14*	(3/2 to 11/2)		C	J$^\pi$: γ to 7/2$^+$. π=(+) for J=3/2,11/2.
243.29[a] *3*	7/2$^-$	0.36 ns *2*	C FGH K NOP R U	J$^\pi$: E1 γ to 5/2$^+$, E2+M1 γ from 9/2$^-$. T$_{1/2}$: cece(t) in ^{151}Gd ε decay. Other: 0.40 ns *7* (from Coul. ex.).
260.47 *3*	5/2$^+$		C GH K NOPQRSTU	J$^\pi$: L(p,t)=0 from 5/2$^+$. Probable bandhead of configuration=5/2[413] (1976Ta10,1975Ta12).
306.27 *3*	(3/2$^+$,5/2,7/2$^+$)		C gh lm st	J$^\pi$: γ's to 7/2$^+$ and (3/2)$^+$.
307.27[b] *5*	(5/2)$^+$		C gh KlmN P RstU	J$^\pi$: strong population of 307.2, 307.6 and 307.8 levels in Coul. ex. suggests positive parity for all three levels. For 307.6 level positive parity is confirmed by M1 γ to 5/2$^+$. J(307.2) is restricted to 5/2, 7/2, 9/2 by γ's to 5/2$^+$ and 7/2$^-$. J(307.6) is limited to 5/2, 7/2 by M1 γ to 5/2$^+$ and M1,E2 γ to 7/2$^+$. J(307.8) is limited to 7/2, 9/2 by γ to 5/2$^+$ and excitation function in in-beam γ-ray study suggesting that J(307.8)>J(307.6). The most probable assignments are (5/2$^+$) for 307.27, (7/2)$^+$ for 307.53 and (9/2$^+$) for 307.86 level. Low spin for 307.27 is consistent with its weak population in in-beam reaction. L(p,t)=(0) from J$^\pi$=5/2$^+$ for at least one member of the levels near 307.
307.53 *1*	(7/2)$^+$	3.3 ps *8*	C Fgh KlmNOP RstU	J$^\pi$: see comment on J$^\pi$ for 307.2 level. T$_{1/2}$: from Coul. ex.
307.86[#] *6*	(9/2)$^+$		D Fgh KlmNOP RstU	J$^\pi$: see J$^\pi$ comment on 307.2 level. ΔJ=1, (M1+E2) γ to 7/2$^+$ and ΔJ=(2) γ to 5/2$^+$.
332.18 *6*	3/2$^+$,5/2$^+$		GH K OP U	J$^\pi$: L(^{3}He,d)=2. Excitation function in (n,n′γ) favors J=3/2. ΔJ=1 γ to 5/2$^+$ favors 3/2$^+$.
336.22 *8*			K OP U	J$^\pi$: γ to (3/2)$^+$ suggests 1/2 to 7/2.
349.85[&] *1*	9/2$^-$	<0.1 ns	CD F K NOP RS U	J$^\pi$: E1 γ to 7/2$^+$, M1 γ to 11/2$^-$. T$_{1/2}$: cece(t) in ^{151}Gd ε decay.
353.65 *2*	5/2$^-$,7/2$^-$		C K NOP U	J$^\pi$: E1 γ to 5/2$^+$, γ to 7/2$^+$ not M2.
415.79 *7*	(7/2$^+$)		C GH K OPQ STU	J$^\pi$: $\sigma(\theta)$ data in (p,t) consistent with assignment as 7/2 member of 5/2[413] band (1975Ta12).
499.70 *5*	(7/2$^+$)		K NOP U	J$^\pi$: γ's to 5/2$^+$, 9/2$^-$ and 192γ, ΔJ=(1) γ to 5/2$^+$ (from Coul. ex.).
502.27[@] *8*	15/2$^-$		DEF K OP R U	J$^\pi$: ΔJ=2, E2 γ to 11/2$^-$.
503.42 *6*	9/2$^+$		FGH KLMNOP RSTU	J$^\pi$: ΔJ=1 γ to 7/2$^+$ and ΔJ=2 γ to 5/2$^+$ (from Coul. ex.). B(E2) in Coul. ex. from 5/2$^+$.
511.13[‡] *7*	(11/2)$^+$		D F K OP R U	J$^\pi$: ΔJ=1, M1+E2 γ to (9/2)$^+$; ΔJ=(2) γ to 7/2$^+$.
522.19 *7*	(3/2$^-$)		gH K OP U	J$^\pi$: γ to 7/2$^-$ and excitation function in (p,2nγ). Also L(^{3}He,d)=(0,1).
522.84 *11*	(≤9/2)		g K	J$^\pi$: γ to 5/2$^+$. π=(+) for 1/2,9/2.
546.33 *9*	(5/2$^+$)		GH K OP U	J$^\pi$: L(^{3}He,d)=(2) and γ to 7/2$^-$.
580.01 *13*			gh KlmNOP stU	J$^\pi$: if observed group in (p,t) corresponds to this level then L=0 gives 5/2$^+$.
587.06 *7*			gh KlmNOP stU	J$^\pi$: see J$^\pi$ comment for 580 level.
600.48 *9*			gh Klm OPQ stU	In Coulomb excitation, only one level at 600.7 is given by 1977Dr04 with all γ rays (shown here with 600.55 and 600.74 levels) shown to deexcite one level; but two separate levels are indicated by other studies. J$^\pi$: if level corresponds to that observed in (p,t) and (^{3}He,d) then J$^\pi$=9/2$^+$ from L=4 in (^{3}He,d) and $\sigma(\theta)$ data in (p,t).
600.74 *7*			gh KlmNOP stU	J$^\pi$: see J$^\pi$ comment for 600.5 level.

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Adopted Levels, Gammas (continued)

^{151}Eu Levels (continued)

E(level)[†]	J^π	XREF	Comments
611.42[#] *6*	13/2⁻	DEF K OPQR U	Level uncertain in (n,n′γ). J^π: ΔJ=2, E2 γ to 9/2⁻; ΔJ=1, M1 γ to 15/2⁻.
632.7 *1*		G K U	
654.4 *3*	5/2⁺	GH K ST	J^π: L(p,t)=0 from 5/2⁺.
697.31 *8*	5/2⁺	GH K MNO STU	J^π: L(p,t)=0 from 5/2⁺.
698.18[a] *7*	(11/2⁻)	D F K OP U	J^π: ΔJ=1, D+Q γ to 9/2⁻; γ′s to 11/2⁻ and 7/2⁻; band assignment.
714.88 *9*	(9/2⁺)	K OP U	J^π: ΔJ=(2) γ (5/2⁺); ΔJ=(0) γ to 9/2⁻.
715 *4*	(1/2⁺)	GH	J^π: L(^{3}He,d)=(0).
719.18 *9*	(7/2⁺,9/2⁺)	H K MNO TU	J^π: γ′s to 5/2⁺, 9/2⁻ and direct population in Coul. ex.
735.01 *12*	(≤9/2)	GH K OP TU	J^π: γ to 5/2⁺.
752.38[#] *7*	(13/2⁺)	D F K OP R U	J^π: ΔJ=(2) γ to (9/2)⁺; γ to 11/2⁻.
757.74 *13*	3/2⁺,5/2⁺	GH K MN T	J^π: L(^{3}He,d)=2.
790.1 *2*	(7/2,11/2)	K M OP U	J^π: ΔJ=1 γ to (9/2)⁺.
807.3 *2*	(7/2⁻)	GH K MN ST	E(level): from Eγ′s in (n,n′γ) although level is uncertain in (n,n′γ) and also in Coulomb excitation. E(level)=802 *1* in (d,t). J^π: γ′s to 5/2⁺ and (9/2⁺); probable L(d,d′)=3.
839 *4*	(5/2⁻,7/2,9/2⁺)	GH	J^π: L=(3,4) from σ(^{3}He,d)/σ(α,t).
859.4? *5*		N	
868 *2*		ST	
881.8 *2*	(11/2⁻)	GH K M OP U	J^π: ΔJ=1, D+Q γ to 9/2⁻ and L=(5) from σ(^{3}He,d)/σ(α,t). Also probable L(d,d′)=3.
889 *1*		J	
902 *3*	5/2⁺	T	J^π: L(p,t)=0 from 5/2⁺.
910 *2*	(⁻)	G MN ST	J^π: probable L(d,d′)=3.
943.2? *10*		U	
946.0 *3*	(5/2⁻,7/2⁻)	GH M OP STU	J^π: L=(3,4) from σ(^{3}He,d)/σ(α,t); probable L(d,d′)=3.
957.24[@] *8*	19/2⁻	DEF K OP R U	J^π: ΔJ=2, E2 γ to 15/2⁻; band assignment.
960.1 *5*		K MN S	Level uncertain in (n,n′γ) and Coul. ex. J^π: γ to (9/2⁻) suggests 5/2 to 13/2; probable L(d,d′)=3 suggests π=−.
973.43[‡] *8*	(15/2)⁺	D F K OP U	J^π: ΔJ=2, E2 γ to (11/2)⁺; M1+E2 γ to (13/2⁺).
1011 *3*		G ST	Level uncertain in (^{3}He,d).
1036 *2*	(⁺)	M	J^π: probable L(d,d′)=2.
1040.92[&] *7*	17/2⁻	DEF K OPQR U	J^π: ΔJ=2, E2 γ to 13/2⁻; ΔJ=1, M1+E2 γ to 15/2⁻.
1049?		S	
1057.18[a] *6*	(15/2⁻)	D F	J^π: ΔJ=(2) γ to (11/2⁻); γ to 13/2⁻; band assignment.
1093.6 *2*	(9/2⁺,11/2⁺,13/2⁺)	GH K M OP TU	J^π: ΔJ=1 or 0, D+Q γ to (11/2)⁺; probable L(d,d′)=2.
1101 *4*		GH N S	
1114.0[b] *1*	(15/2⁺)	D F H M OP STU	J^π: ΔJ=1, D+Q γ to 13/2⁻; γ to 15/2⁻; band assignment. Probable L(d,d′)=2.
1152 *3*		GH M ST	
1163 *2*	(⁻)	M	J^π: probable L(d,d′)=3.
1177 *3*		ST	
1201 *3*	(3/2⁺,5/2⁺)	GH ST	J^π: L(^{3}He,d)=(2).
1220.75[#] *9*	(17/2⁺)	D F K OP U	J^π: ΔJ=1, (M1+E2) γ to 15/2⁺; ΔJ=2, E2 γ to (13/2⁺).
1225 *4*		GH	
1233 *4*		H	
1250 *3*	(1/2,3/2⁻)	GH ST	J^π: L=(0,1) from σ(^{3}He,d)/σ(α,t).
1283 *4*	(1/2⁺)	GH	J^π: L(^{3}He,d)=(0).
1304 *4*	(7/2⁺,9/2⁺)	GH	J^π: L(^{3}He,d)=4.
1326 *3*	9/2⁻,11/2⁻	GH S	J^π: L(^{3}He,d)=5.
1342 *3*		GH ST	
1353 *3*		T	

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Adopted Levels, Gammas (continued)

^{151}Eu Levels (continued)

E(level)[†]	J^{π}	XREF	Comments
1383.24[c] *12*	$(17/2^+)$	F	J^{π}: ΔJ=1 γ to $15/2^-$; band assignment.
1406 *3*	$(3/2^+,5/2,7/2^-)$	GH T	J^{π}: L=(2,3) from $\sigma(^3$He,d$)/\sigma(\alpha$,t).
1421 *1*		J	
1423 *3*	$(1/2^+)$	GH S	J^{π}: L(^{3}He,d)=(0).
1458 *4*		GH	
1462.64[‡] *8*	$(19/2^+)$	D F O U	J^{π}: ΔJ=1 γ to $17/2^-$; ΔJ=(2) γ to $(15/2)^+$.
1488 *4*	$(\leq 5/2)$	GH	J^{π}: L≤2 from $\sigma(^3$He,d$)/\sigma(\alpha$,t).
1503.26[@] *9*	$(23/2)^-$	DEF O R U	J^{π}: ΔJ=2, E2 γ to $19/2^-$; band assignment.
1504.69[a] *7*	$(19/2^-)$	D F	J^{π}: ΔJ=(2) γ to $15/2^-$; γ to $17/2^-$.
1505 *3*	$(3/2^+,5/2^+)$	GH S	J^{π}: L=(2) from $\sigma(^3$He,d$)/\sigma(\alpha$,t).
1506.93[b] *8*	$(19/2^+)$	D F U	J^{π}: ΔJ=1, (E1) γ to $17/2^-$; ΔJ=(0) γ to $19/2^-$; ΔJ=(2) γ to $(15/2^+)$.
1527 *4*		G	
1563.84[&] *8*	$21/2^-$	DEF O U	J^{π}: ΔJ=2, E2 γ to $17/2^-$; ΔJ=1, M1+E2 γ to $19/2^-$.
1565 *4*	$(1/2^+)$	GH	J^{π}: L(^{3}He,d)=(0).
1576 *4*	$(3/2^+,5/2^+)$	GH	J^{π}: L=(2) from $\sigma(^3$He,d$)/\sigma(\alpha$,t).
1596 *4*		GH	
1645 *3*	$(5/2^-,7/2^-)$	GH T	J^{π}: L=(3) from $\sigma(^3$He,d$)/\sigma(\alpha$,t).
1671 *4*	$(3/2^+,5/2,7/2^-)$	GH	J^{π}: L=(2,3) from $\sigma(^3$He,d$)/\sigma(\alpha$,t).
1691 *4*		G	
1712 *4*		GH	
1719.4[#] *1*	$(21/2^+)$	D F	J^{π}: ΔJ=2, E2 γ to $(17/2^+)$; ΔJ=1 γ to $19/2^-$.
1732.8 *2*	$(21/2^+)$	D	J^{π}: ΔJ=(1) γ to $19/2^-$; band assignment.
1749 *4*	$1/2^+$	GH	J^{π}: L(^{3}He,d)=0.
1752.3[f] *1*	$(19/2^+)$	D F	J^{π}: ΔJ=1 γ to $(17/2^+)$; band assignment.
1762 *4*		S	
1764.9[c] *1*	$(21/2^+)$	D F	J^{π}: ΔJ=1 γ to $19/2^-$; band assignment.
1795 *4*	$(3/2^+,5/2,7/2^-)$	GH	J^{π}: L=(2,3) from $\sigma(^3$He,d$)/\sigma(\alpha$,t).
1803 *1*		J	
1814 *4*	$(7/2^+,9/2^+)$	GH	J^{π}: L=(4) from $\sigma(^3$He,d$)/\sigma(\alpha$,t).
1833 *4*		S	
1849 *4*	$(3/2^+,5/2,7/2^-)$	GH	J^{π}: L=(2,3) from $\sigma(^3$He,d$)/\sigma(\alpha$,t).
1876 *4*	$(3/2^+,5/2^+)$	GH	J^{π}: L=(2) from $\sigma(^3$He,d$)/\sigma(\alpha$,t).
1912 *4*		S	
1948.0[b] *1*	$(23/2)^+$	D F	J^{π}: ΔJ=2 γ's to $(19/2^+)$; ΔJ=1 E1 γ to $21/2^-$.
1964.8[d] *2*	$(21/2^+)$	F	J^{π}: γ to $(17/2^+)$; band assignment.
1994.9[a] *1*	$(23/2^-)$	D F	J^{π}: γ to $19/2^-$; band assignment.
1995.9[‡] *1*	$(23/2^+)$	D F O U	J^{π}: ΔJ=2 γ to $(19/2^+)$; γ to $21/2^-$.
2022 *3*		S	
2072 *3*		S	
2110		S	
2118.0[@] *1*	$(27/2)^-$	DEF R	J^{π}: ΔJ=2, E2 γ to $(23/2)^-$; band assignment.
2151.8[&] *1*	$25/2^-$	D F U	J^{π}: ΔJ=2, E2 γ to $21/2^-$; ΔJ=1, M1+E2 γ to $(23/2)^-$.
2170.5[c] *1*	$(25/2^+)$	D F	J^{π}: ΔJ=1 γ to $(23/2)^-$; γ to $(21/2^+)$; band assignment.
2224.3[f] *2*	$(23/2^+)$	D F	J^{π}: γ's to $(19/2^+)$ and $(21/2^+)$; band assignment.
2237.5 *2*	$(25/2^+)$	D	J^{π}: ΔJ=(2) γ to $(21/2^+)$.
2275.7[#] *1*	$(25/2^+)$	D F	J^{π}: ΔJ=2 γ to $(21/2^+)$ and band assignment. But DCO ratios for 510.9γ (to $(21/2^+)$) and 772.5γ (to $(23/2)^-$) are inconsistent with expected ΔJ=2 and ΔJ=1, dipole, respectively.
2307 *5*		S	
2327 *1*		J S	XREF: S(2331).
2348 *4*		S	
2419 *6*		S	

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Adopted Levels, Gammas (continued)

^{151}Eu Levels (continued)

E(level)[†]	J$^{\pi}$	XREF	Comments
2438.3[b] 1	(27/2)$^+$	D F	J$^{\pi}$: ΔJ=2 γ to (23/2$^+$); ΔJ=(0), E1 γ to (27/2)$^-$.
2457.1[d] 2	(25/2$^+$)	F	J$^{\pi}$: γ′s to (23/2)$^-$ and (21/2$^+$); band assignment.
2494 4		S	
2510 5		S	
2520.6[a] 1	(27/2$^-$)	D F	J$^{\pi}$: γ′s to (25/2$^+$) and (23/2)$^-$; band assignment.
2535 1		J	
2557.4[‡] 2	(27/2$^+$)	D F	J$^{\pi}$: ΔJ=2 γ to (23/2$^+$) and band assignment.
2610.8[e] 1	(27/2$^+$)	D F	J$^{\pi}$: ΔJ=2 γ to (23/2$^+$) and (M1) γ to (27/2)$^+$.
2636.3[c] 1	(29/2)$^+$	D F	J$^{\pi}$: ΔJ=1, E1 γ to (27/2)$^-$; (E2) γ to (25/2$^+$).
2647 1		J S	XREF: S(2644).
2659 1		J	
2694 1		J	
2711 4		S	
2734.8[f] 2	(27/2$^+$)	D F	J$^{\pi}$: γ′s to (25/2$^+$) and (23/2$^+$); band assignment.
2751 4		S	
2773.6[d] 1	(29/2$^+$)	D F	J$^{\pi}$: ΔJ=1 γ to (27/2)$^-$ and band assignment.
2782.6[&] 1	(29/2$^-$)	D F	J$^{\pi}$: ΔJ=2 γ to 25/2$^-$ and γ to (27/2)$^-$.
2789.7[@] 1	(31/2)$^-$	D F	J$^{\pi}$: ΔJ=2, E2 γ to (27/2)$^-$ and band assignment.
2834 1		J S	XREF: S(2827).
2856.9[#] 2	(29/2$^+$)	D F	J$^{\pi}$: γ to (25/2$^+$) and band assignment.
2923.5 2		D F	J$^{\pi}$: γ to (25/2$^+$) suggests (25/2,27/2,29/2$^+$).
2955.3[b] 1	(31/2)$^+$	D F	J$^{\pi}$: ΔJ=2, E2 γ to (27/2)$^+$; (E1) γ to (29/2$^-$).
2990.4[e] 1	(31/2$^+$)	D F	J$^{\pi}$: ΔJ=2 γ′s to (27/2)$^+$; γ to (29/2$^+$).
3046.0[d] 1	(33/2)$^+$	D F	J$^{\pi}$: ΔJ=2, E2 γ to (29/2)$^+$; ΔJ=1, E1 γ to (31/2)$^-$.
3057.4 2		F	J$^{\pi}$: γ to (27/2)$^-$ suggests (27/2,29/2,31/2$^-$).
3089.3[a] 1	(31/2$^-$)	D F	J$^{\pi}$: γ′s to (29/2$^+$) and (27/2$^-$); band assignment.
3092.5 2		D F	J$^{\pi}$: γ to (27/2)$^-$ suggests (27/2,29/2,31/2$^-$). ΔJ=(2) γ to (27/2)$^-$ marginally favors 31/2$^-$.
3163.8[‡] 2	(31/2$^+$)	D F	J$^{\pi}$: γ to (27/2$^+$) and band assignment.
3183.3[c] 1	(33/2$^+$)	F	J$^{\pi}$: ΔJ=1 γ to (31/2)$^-$ and band assignment.
3378.5[&] 1	(33/2$^-$)	D F	J$^{\pi}$: ΔJ=2 γ to (29/2$^-$) and γ to (31/2)$^-$.
3479.8[e] 2	(35/2$^+$)	D F	J$^{\pi}$: ΔJ=(2) γ to (31/2)$^+$ and band assignment.
3495.0[#] 3	(33/2$^+$)	F	J$^{\pi}$: γ to (29/2$^+$) and band assignment.
3497.9[@] 1	(35/2)$^-$	D F	J$^{\pi}$: ΔJ=2, E2 γ to (31/2)$^-$ and band assignment.
3509.8 3		F	
3529.0[b] 2	(35/2$^+$)	D F	J$^{\pi}$: ΔJ=2 γ to (31/2)$^+$ and band assignment.
3544.5[d] 2	(37/2$^+$)	D F	J$^{\pi}$: ΔJ=2, (E2) γ to (33/2)$^+$ and band assignment.
3772.7[c] 1	(37/2$^+$)	F	J$^{\pi}$: γ′s to (35/2)$^-$ and (33/2$^+$); band assignment.
3807.5[‡] 3	(35/2$^+$)	D F	J$^{\pi}$: γ to (31/2$^+$) and band assignment.
3838 1		J	
3879.3[&] 1	(37/2$^-$)	D F	J$^{\pi}$: (M1) γ to (35/2)$^-$ and band assignment.
3918 1		J	
4119.9[e] 2	(39/2$^+$)	D F	J$^{\pi}$: ΔJ=2 γ to (35/2$^+$) and band assignment.
4126.8[@] 2	(39/2)$^-$	D F	J$^{\pi}$: ΔJ=2, E2 γ to (35/2)$^-$; (M1+E2) γ to (37/2$^-$).
4140.6[b] 2	(39/2$^+$)	D F	J$^{\pi}$: γ to (35/2$^+$) and band assignment.
4185.8[d] 2	(41/2$^+$)	D F	J$^{\pi}$: ΔJ=2 γ to (37/2$^+$) and band assignment.
4292.2[a] 2	(39/2$^-$)	F	J$^{\pi}$: ΔJ=2 γ to (35/2)$^-$ and band assignment. But the band assignment seems questionable since no intraband transition is reported.
4404.1[c] 3	(41/2$^+$)	F	J$^{\pi}$: γ to (37/2$^+$) and band assignment.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{151}Eu Levels (continued)

E(level)[†]	J^π	XREF	Comments
4460.8[&] 2	(41/2⁻)	D F	J^π: ΔJ=2 γ to (37/2⁻); ΔJ=1, D+Q γ to (39/2)⁻.
4730.6[@] 4	(43/2⁻)	D F	J^π: γ to (39/2)⁻ and band assignment.
4807.8[b] 3	(43/2⁺)	D	J^π: γ to (39/2⁺) and band assignment.
4859.1[e] 3	(43/2⁺)	D F	J^π: γ to (39/2⁺) and band assignment.
4968.4[d] 3	(45/2⁺)	D F	J^π: γ to (41/2⁺) and band assignment.
5663.1[e] 4	(47/2⁺)	D F	J^π: γ to (43/2⁺) and band assignment.
5776.9[d] 5	(49/2⁺)	D F	J^π: γ to (45/2⁺) and band assignment.

† From least-squares fit to Eγ′s for levels populated in γ-ray studies. Others are from (^{3}He,d), (α,t), (p,p′), (d,d′), (d,t), and (p,t) reactions. Weighted averages are taken when a level is populated only in particle-transfer reactions.

‡ Band(A): $\pi g_{7/2}^{-1}$, α=−1/2. 1994Jo09 assign K=15/2 to 19/2⁺, 23/2⁺, 27/2⁺, 31/2⁺ members of this band.

Band(B): $\pi g_{7/2}^{-1}$, α=+1/2. 1994Jo09 assign K=17/2 to 25/2⁺, 29/2⁺, 33/2⁺ members of this band.

@ Band(C): $\pi h_{11/2}^{2} \otimes \pi d_{5/2}^{-2}$,α=−1/2.

& Band(D): $\pi h_{11/2}^{2} \otimes \pi d_{5/2}^{-2}$,α=+1/2.

a Band(E): ΔJ=2 band. possibly due to $h_{11/2}$ proton + deformed core. Similar features between the members of this band and the $g_{7/2}$ band starting at 196.2 suggest a parity-doublet structure. But no strong E1 transitions have been observed.

b Band(F): ΔJ=2 band (1993Ve04). possibly from coupling of 9/2⁻ (arising from $h_{11/2}$ orbital) with 3⁻ octupole state. 1995Jo18 assign 3480, 4120, 4859 and 5663 levels as the 35/2⁺, 39/2⁺, 43/2⁺ and 47/2⁺ band members, respectively of this band.

c Band(G): ΔJ=2 band (1993Ve04). 1995Jo18 assign 2170 and 2636 levels to another band.

d Band(H): ΔJ=2 band (1993Ve04). possibly from coupling of $h_{11/2}$ state with 3⁻ octupole state. 1995Jo18 assign 21/2⁺, 25/2⁺ and 29/2⁺ members at 1732, 2170 and 2636, respectively.

e Band(I): ΔJ=2 band (1993Ve04). 1995Jo18 assign 3529, 4141 and 4808 levels as the 35/2⁺, 39/2⁺ and 43/2⁺ members, respectively of this band.

f Band(J): ΔJ=2 band (1995Jo18).

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$\gamma(^{151}Eu)$

In the following levels populated in high-spin data, severe discrepancies (factors of 2 to 10) are noted in branching ratios deduced from Iγ′s of 1993Ve04 and 1995Jo18: 611.4 (13/2−), 1057.2 (15/2−), 1220.7 (17/2+), 1504.7 (19/2−), 1506.9 (19/2+), 1948.0 (23/2+), 2224.3 (23/2+), 2275.7 (25/2+), 2438.3 (27/2+), 2782.6 (29/2−), 3046.1 (33/2+), 3378.5 (33/2−), 3528.9 (35/2+), 3879.4 (37/2−). For these levels, values from 1995Jo18 are not used in averaging.

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	α@	Comments
21.541	7/2+	21.542 *3*	100	0.0	5/2+	M1+E2	0.029 *1*	27.6	B(M1)(W.u.)=8.3×10−3 *4*; B(E2)(W.u.)=8.1 *9* α(L)=21.7 *4*; α(M)=4.70 *7*; α(N+..)=1.257 *19* α(N)=1.073 *16*; α(O)=0.1678 *25*; α(P)=0.01552 *22* Eγ: weighted average of 21.543 *3* (1989Di05), 21.50 *3* (1983Vo10), 21.540 *6* (1974HeYW), 21.529 *14* (1970An17), 21.54 *2* (1970Fo02), 21.6 *1* (1969Ho30), 21.55 *5* (1968Gr25). Other: 21.497 *13* (1982BaZX).
196.245	11/2−	174.70 *1*	100	21.541	7/2+	M2		2.35	B(M2)(W.u.)=0.0336 *4* α(K)=1.86 *3*; α(L)=0.378 *6*; α(M)=0.0853 *12*; α(N+..)=0.0229 *4* α(N)=0.0196 *3*; α(O)=0.00305 *5*; α(P)=0.000272 *4* α(K)exp=1.8 *2* from I(K x ray)/Iγ (1967Co20) consistent with M2.
		196	1.49 *16*	0.0	5/2+	[E3]		1.389	B(E3)(W.u.)=5.9 *6* α(K)=0.586 *9*; α(L)=0.618 *9*; α(M)=0.1481 *21*; α(N+..)=0.0376 *6* α(N)=0.0330 *5*; α(O)=0.00451 *7*; α(P)=5.27×10−5 *8* Iγ: deduced from B(E3)=0.0160 *15* (Coul. ex.) and $T_{1/2}$=58.9 μs *5*. From ^{151}Gd ε decay, Iγ<1.0.
196.54	(3/2)+	175.00 *15*	1.04 *8*	21.541	7/2+	[E2]		0.338	B(E2)(W.u.)=2.4 *4* α(K)=0.229; α(L)=0.084; α(M)=0.019; α(N+..)=0.0050 α(N)=0.0043; α(O)=0.00061; α(P)=1.9×10−5
		196.54 *4*	100 *4*	0.0	5/2+	E2+M1	0.45 *15*	0.268 *6*	B(M1)(W.u.)=0.0078 *16*; B(E2)(W.u.)=22 *12* α(K)=0.221 *8*; α(L)=0.0363 *20*; α(M)=0.0080 *5*; α(N+..)=0.00211 *12* α(N)=0.00181 *11*; α(O)=0.000280 *13*; α(P)=2.37×10−5 *12* Mult.,δ: from B(E2) in Coul. ex. and adopted branching ratios.
216.72	(3/2 to 11/2)	195.18 *14*	100	21.541	7/2+	[D,E2]		0.17 *12*	
243.29	7/2−	221.80 *7*	0.042 *7*	21.541	7/2+	[E1]		0.0333	B(E1)(W.u.)=2.5×10−8 *5* α(K)=0.0283 *4*; α(L)=0.00395 *6*; α(M)=0.000848 *12*; α(N+..)=0.000225 *4* α(N)=0.000192 *3*; α(O)=2.97×10−5 *5*; α(P)=2.61×10−6 *4*
		243.282 *12*	100.0 *6*	0.0	5/2+	E1		0.0262	B(E1)(W.u.)=4.5×10−5 *3* α(K)=0.0223 *4*; α(L)=0.00309 *5*; α(M)=0.000663 *10*;

From ENSDF

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Adopted Levels, Gammas (continued)

$\gamma(^{151}Eu)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	δ‡	α@	Comments
									α(N+..)=0.0001759 *25* α(N)=0.0001505 *21*; α(O)=2.33×10^{-5} *4*; α(P)=2.07×10^{-6} *3*
260.47	$5/2^+$	63.92# *7*	1.0 *2*	196.54	$(3/2)^+$	[M1,E2]		10 *4*	α(K)=4.4 *13*; α(L)=4 *4*; α(M)=1.0 *9*; α(N+..)=0.25 *21* α(N)=0.22 *19*; α(O)=0.030 *24*; α(P)=0.00044 *20*
		238.94 *5*	100	21.541	$7/2^+$	M1		0.1619	α(K)=0.1373 *20*; α(L)=0.0193 *3*; α(M)=0.00417 *6*; α(N+..)=0.001122 *16* α(N)=0.000955 *14*; α(O)=0.0001517 *22*; α(P)=1.509×10^{-5} *22*
		260.46 *5*	49 *5*	0.0	$5/2^+$	M1(+E2)	<1	0.119 *10*	α(K)=0.099 *11*; α(L)=0.0158 *6*; α(M)=0.00346 *17*; α(N+..)=0.00092 *4* α(N)=0.00079 *4*; α(O)=0.000122 *3*; α(P)=1.05×10^{-5} *15* I_γ: unweighted average of available values.
306.27	$(3/2^+,5/2,7/2^+)$	109.74 *4*	100 *50*	196.54	$(3/2)^+$	[D,E2]		1.0 *8*	
		284.72 *3*	76 *30*	21.541	$7/2^+$				
307.27	$(5/2)^+$	63.9 *1*	10 *2*	243.29	$7/2^-$	(E1)		0.940	α(K)=0.780 *12*; α(L)=0.1255 *19*; α(M)=0.0271 *4*; α(N+..)=0.00700 *11* α(N)=0.00605 *9*; α(O)=0.000885 *13*; α(P)=6.12×10^{-5} *9* Mult.: from intensity estimates (Coul. ex., 1977Dr04).
		110.74 *6*	100 *6*	196.54	$(3/2)^+$	[M1,E2]		1.53 *15*	α(K)=1.03 *14*; α(L)=0.39 *23*; α(M)=0.09 *6*; α(N+..)=0.023 *14* α(N)=0.020 *12*; α(O)=0.0028 *15*; α(P)=0.00010 *4*
		307.23 *13*	68 *16*	0.0	$5/2^+$				Iγ′s and Eγ′s of γ′s from 307.2 level are from Coul. ex.
307.53	$(7/2)^+$	286.09 *2*	8.6 *3*	21.541	$7/2^+$	M1(+E2)	<1	0.092 *9*	B(M1)(W.u.)=0.015 *5*; B(E2)(W.u.)<80 α(K)=0.076 *9*; α(L)=0.01197 *21*; α(M)=0.00261 *7*; α(N+..)=0.000696 *13* α(N)=0.000595 *13*; α(O)=9.26×10^{-5} *14*; α(P)=8.2×10^{-6} *12* E_γ: level energy difference is 285.99. Uncertainty of 0.02 may be an underestimate.
		307.50 *1*	100.0 *24*	0.0	$5/2^+$	M1		0.0824	B(M1)(W.u.)=0.20 *5* α(K)=0.0699 *10*; α(L)=0.00977 *14*; α(M)=0.00211 *3*; α(N+..)=0.000567 *8* α(N)=0.000483 *7*; α(O)=7.67×10^{-5} *11*; α(P)=7.66×10^{-6} *11*
307.86	$(9/2)^+$	286.30 *8*	100 *8*	21.541	$7/2^+$	(M1+E2)		0.083 *17*	α(K)=0.068 *17*; α(L)=0.0121 *3*; α(M)=0.00266 *12*; α(N+..)=0.000702 *18* α(N)=0.000603 *21*; α(O)=9.18×10^{-5} *17*; α(P)=7.0×10^{-6} *23* Mult.: from α(K)exp in in-beam γ-ray works.
		307.8 *1*	25 *3*	0.0	$5/2^+$	(Q)			Iγ′s and Eγ′s for 307.8 level are from Coul. ex.
332.18	$3/2^+,5/2^+$	135.36 *18*	7.4 *16*	196.54	$(3/2)^+$	[M1,E2]		0.801 *24*	α(K)=0.58 *9*; α(L)=0.17 *8*; α(M)=0.039 *19*; α(N+..)=0.010 *5* α(N)=0.009 *5*; α(O)=0.0013 *6*; α(P)=5.6×10^{-5} *17* From (n,n′γ) only.
		332.29 *7*	100 *2*	0.0	$5/2^+$	D			

Adopted Levels, Gammas (continued)

$\gamma(^{151}Eu)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult. ‡	δ ‡	α @	Comments
336.22		139.68 *7*	100	196.54	$(3/2)^+$				
349.85	$9/2^-$	106.57 *1*	1.40 *4*	243.29	$7/2^-$	E2+M1	+10 *+10−2*	1.92	B(E2)(W.u.)>70 α(K)=0.992 *14*; α(L)=0.719 *11*; α(M)=0.168 *3*; α(N+..)=0.0424 *7* α(N)=0.0373 *6*; α(O)=0.00508 *8*; α(P)=7.41×10^{-5} *12* δ: from $\gamma\gamma(\theta)$ in ^{151}Gd ε decay (1985Be64).
		153.60 *1*	100.0 *5*	196.245	$11/2^-$	M1+E2	+0.18 *3*	0.546	α(K)=0.459 *7*; α(L)=0.0683 *13*; α(M)=0.0148 *3*; α(N+..)=0.00397 *8* α(N)=0.00339 *7*; α(O)=0.000533 *10*; α(P)=5.04×10^{-5} *8* δ: from $\gamma(\theta$,T) in ^{151}Gd ε decay (1987Be33).
		328.31 *1*	1.33 *4*	21.541	$7/2^+$	E1		0.01222	B(E1)(W.u.)>5.6×10^{-7} α(K)=0.01042 *15*; α(L)=0.001422 *20*; α(M)=0.000305 *5*; α(N+..)=8.12×10^{-5} *12* α(N)=6.94×10^{-5} *10*; α(O)=1.082×10^{-5} *16*; α(P)=9.95×10^{-7} *14*
		349.85[b] *4*	0.053 *3*	0.0	$5/2^+$	[M2]		0.226	α(K)=0.186 *3*; α(L)=0.0315 *5*; α(M)=0.00696 *10*; α(N+..)=0.00187 *3* α(N)=0.001596 *23*; α(O)=0.000251 *4*; α(P)=2.36×10^{-5} *4*
353.65	$5/2^-,7/2^-$	93.21 *7*	1.5 *5*	260.47	$5/2^+$	[E1]		0.343	α(K)=0.288 *4*; α(L)=0.0433 *7*; α(M)=0.00933 *14*; α(N+..)=0.00243 *4* α(N)=0.00210 *3*; α(O)=0.000314 *5*; α(P)=2.38×10^{-5} *4*
		110.33 *6*	3.9 *5*	243.29	$7/2^-$	[M1,E2]		1.55 *16*	α(K)=1.04 *15*; α(L)=0.39 *23*; α(M)=0.09 *6*; α(N+..)=0.023 *14* α(N)=0.020 *12*; α(O)=0.0029 *16*; α(P)=0.00010 *4*
		157.08 *10*	0.6 *2*	196.54	$(3/2)^+$	[E1]		0.0836	α(K)=0.0708 *10*; α(L)=0.01009 *15*; α(M)=0.00217 *3*; α(N+..)=0.000572 *8* α(N)=0.000491 *7*; α(O)=7.50×10^{-5} *11*; α(P)=6.28×10^{-6} *9*
		332.11 *3*	6.8 *5*	21.541	$7/2^+$	(E1)		0.01188	α(K)=0.01012 *15*; α(L)=0.001381 *20*; α(M)=0.000296 *5*; α(N+..)=7.89×10^{-5} *11* α(N)=6.74×10^{-5} *10*; α(O)=1.052×10^{-5} *15*; α(P)=9.68×10^{-7} *14*
		353.66 *2*	100.0 *24*	0.0	$5/2^+$	E1		0.01018	α(K)=0.00868 *13*; α(L)=0.001180 *17*; α(M)=0.000253 *4*; α(N+..)=6.75×10^{-5} *10* α(N)=5.76×10^{-5} *8*; α(O)=9.00×10^{-6} *13*; α(P)=8.34×10^{-7} *12*
415.79	$(7/2^+)$	155.3 *2*	56 *5*	260.47	$5/2^+$	[M1,E2]		0.519 *13*	α(K)=0.39 *6*; α(L)=0.10 *4*; α(M)=0.023 *10*; α(N+..)=0.0059 *23* α(N)=0.0052 *20*; α(O)=0.00075 *25*; α(P)=3.8×10^{-5} *12*
		172.4 *2*	41 *5*	243.29	$7/2^-$	[E1]		0.0651	α(K)=0.0552 *8*; α(L)=0.00781 *12*; α(M)=0.001679 *25*; α(N+..)=0.000443 *7* α(N)=0.000380 *6*; α(O)=5.83×10^{-5} *9*; α(P)=4.95×10^{-6} *7* I_γ: 12 *4* in high spin data.
		394.26 *9*	100 *5*	21.541	$7/2^+$				

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γ(^{151}Eu) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	α[@]	Comments
415.79	(7/2$^+$)	415.84[b] *10*	72 *19*	0.0	5/2$^+$			I_γ: from ^{151}Gd ε decay. This placement is considered uncertain by the evaluator since it is not confirmed in in-beam γ-ray studies.
499.70	(7/2$^+$)	146.3 *2*	4.2 *15*	353.65	5/2$^-$,7/2$^-$	[E1]	0.1013	α(K)=0.0857 *13*; α(L)=0.01228 *18*; α(M)=0.00264 *4*; α(N+..)=0.000695 *10* α(N)=0.000597 *9*; α(O)=9.10×10^{-5} *14*; α(P)=7.53×10^{-6} *11*
		149.87 *17*	13 *3*	349.85	9/2$^-$	[E1]	0.0949	α(K)=0.0803 *12*; α(L)=0.01149 *17*; α(M)=0.00247 *4*; α(N+..)=0.000651 *10* α(N)=0.000558 *8*; α(O)=8.53×10^{-5} *13*; α(P)=7.08×10^{-6} *11* I_γ: 38 *5* in high spin data.
		192.38 *7*	104 *15*	307.27	(5/2)$^+$	[M1,E2]	0.269 *24*	α(K)=0.21 *4*; α(L)=0.046 *11*; α(M)=0.010 *3*; α(N+..)=0.0027 *7* α(N)=0.0023 *6*; α(O)=0.00034 *7*; α(P)=2.1×10^{-5} *7* I_γ: 62 *14* in high spin data.
		256.45 *10*	50.4 *23*	243.29	7/2$^-$	[E1]	0.0228	α(K)=0.0194 *3*; α(L)=0.00269 *4*; α(M)=0.000577 *8*; α(N+..)=0.0001531 *22* α(N)=0.0001310 *19*; α(O)=2.03×10^{-5} *3*; α(P)=1.82×10^{-6} *3*
		303.1 *2*	10 *2*	196.54	(3/2)$^+$			
		499.7 *1*	100 *4*	0.0	5/2$^+$			
502.27	15/2$^-$	306.0 *1*	100	196.245	11/2$^-$	E2	0.0548	α(K)=0.0424 *6*; α(L)=0.00964 *14*; α(M)=0.00216 *3*; α(N+..)=0.000563 *8* α(N)=0.000487 *7*; α(O)=7.16×10^{-5} *10*; α(P)=3.95×10^{-6} *6*
503.42	9/2$^+$	195.84 *8*	104 *14*	307.53	(7/2)$^+$	[M1,E2]	0.255 *24*	α(K)=0.20 *4*; α(L)=0.043 *10*; α(M)=0.0097 *25*; α(N+..)=0.0025 *6* α(N)=0.0022 *6*; α(O)=0.00032 *7*; α(P)=2.0×10^{-5} *6*
		196.5[b]	≤2.9	307.27	(5/2)$^+$	[E2]	0.228	α(K)=0.1609 *23*; α(L)=0.0524 *8*; α(M)=0.01199 *17*; α(N+..)=0.00307 *5* α(N)=0.00268 *4*; α(O)=0.000381 *6*; α(P)=1.371×10^{-5} *20*
		260.2 *1*	7.9 *7*	243.29	7/2$^-$			
		482.05 *15*	33.6 *7*	21.541	7/2$^+$			
		503.34 *12*	100.0 *4*	0.0	5/2$^+$			
511.13	(11/2)$^+$	203.21 *9*	13.0 *10*	307.86	(9/2)$^+$	M1+E2	0.228 *24*	α(K)=0.18 *4*; α(L)=0.038 *8*; α(M)=0.0085 *20*; α(N+..)=0.0022 *5* α(N)=0.0019 *5*; α(O)=0.00028 *5*; α(P)=1.8×10^{-5} *6*
		489.67 *9*	100	21.541	7/2$^+$	Q		
522.19	(3/2$^-$)	168.61 *9*	54 *5*	353.65	5/2$^-$,7/2$^-$	[D,E2]	0.23 *16*	
		279[b]		243.29	7/2$^-$			
		325.57 *10*	100 *5*	196.54	(3/2)$^+$			
522.84	(≤9/2)	522.84 *11*	100	0.0	5/2$^+$			
546.33	(5/2$^+$)	214.44[b] *15*	15 *4*	332.18	3/2$^+$,5/2$^+$	[M1,E2]	0.194 *24*	α(K)=0.15 *3*; α(L)=0.031 *6*; α(M)=0.0070 *14*; α(N+..)=0.0018 *4* α(N)=0.0016 *3*; α(O)=0.00024 *4*; α(P)=1.5×10^{-5} *5*
		303.03 *18*	14 *5*	243.29	7/2$^-$			
		546.19 *11*	100 *6*	0.0	5/2$^+$			Eγ and Iγ of γ′s from 546 level from (n,n′γ). In high-spin data, 214γ is not reported and 546γ is assigned to a 1503 level.
580.01		383.48 *12*	100	196.54	(3/2)$^+$			
		579.2[b] *2*		0.0	5/2$^+$			E_γ: from Coul. ex. only. This γ ray is considered uncertain (by

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γ(^{151}Eu) (continued)

E$_i$(level)	J_i^π	E$_\gamma$[†]	I$_\gamma$[†]	E$_f$	J_f^π	Mult.[‡]	α[@]	Comments
								evaluator) since no evidence is provided in other reactions such as (p,2nγ) (1979Lo06).
587.06		279.45[a] *13*	29[a] *5*	307.86	(9/2)$^+$			
		279.45[a] *13*	25[a] *5*	307.53	(7/2)$^+$			
		343.78 *7*	100 *10*	243.29	7/2$^-$			
		587.01 *13*	26 *9*	0.0	5/2$^+$			I$_\gamma$: from Iγ(587γ)/Iγ(279γ) in (n,n′γ).
600.48		184.8 *3*	18 *8*	415.79	(7/2$^+$)	[D,E2]	0.17 *11*	I$_\gamma$: from (n,n′γ). Iγ=50 *8* in high spin gammas. γ not seen in Coul. ex.
		250.4 *3*	17 *4*	349.85	9/2$^-$	[D,E2]	0.06 *4*	I$_\gamma$: from Coul. ex. and (n,n′γ). Iγ=46 *9* in high spin gammas.
		293.3[a] *2*	33[a] *9*	307.27	(5/2)$^+$			E$_\gamma$,I$_\gamma$: from Coul. ex.
		340.0 *1*	100 *8*	260.47	5/2$^+$			
600.74		247.2 *2*	3.7 *12*	353.65	5/2$^-$,7/2$^-$	[D,E2]	0.07 *4*	I$_\gamma$: from Coul. ex.
		292.9 *2*	28 *2*	307.86	(9/2)$^+$			E$_\gamma$,I$_\gamma$: from Coul. ex.
		293.3[a] *2*	23[a] *3*	307.53	(7/2)$^+$			E$_\gamma$,I$_\gamma$: from Coul. ex.
		579.13 *10*	100 *8*	21.541	7/2$^+$			
		600.78 *10*	75 *6*	0.0	5/2$^+$			
611.42	13/2$^-$	109.1 *1*	36 *2*	502.27	15/2$^-$	M1	1.438	α(K)=1.217 *18*; α(L)=0.1739 *25*; α(M)=0.0376 *6*; α(N+..)=0.01010 *15* α(N)=0.00861 *13*; α(O)=0.001364 *20*; α(P)=0.0001346 *20*
		261.5 *1*	28 *3*	349.85	9/2$^-$	E2	0.0896	α(K)=0.0676 *10*; α(L)=0.01718 *25*; α(M)=0.00388 *6*; α(N+..)=0.001004 *15* α(N)=0.000872 *13*; α(O)=0.0001265 *18*; α(P)=6.12×10^{-6} *9*
		415.2 *1*	100 *4*	196.245	11/2$^-$	M1+E2	0.030 *8*	α(K)=0.025 *7*; α(L)=0.0039 *5*; α(M)=0.00085 *10*; α(N+..)=0.00023 *3* α(N)=0.000194 *24*; α(O)=3.0×10^{-5} *5*; α(P)=2.6×10^{-6} *9*
632.7		325[b]		307.53	(7/2)$^+$			A 325.6γ in (n,n′γ) is assigned from 522 level only. This γ can proceed to any of three levels near 307 keV.
		436.2 *2*	100 *9*	196.54	(3/2)$^+$			
		632.7[&] *1*	<200[&]	0.0	5/2$^+$			
654.4	5/2$^+$	411.2[b] *4*	100 *40*	243.29	7/2$^-$			
		632.7[&] *1*	<1600[&]	21.541	7/2$^+$			
		654.4 *4*	100 *40*	0.0	5/2$^+$			
697.31	5/2$^+$	343.73 *15*	13 *1*	353.65	5/2$^-$,7/2$^-$			
		389.8 *1*	100 *6*	307.53	(7/2)$^+$			
		500.6 *2*	57 *6*	196.54	(3/2)$^+$			
		697.1 *2*	53 *10*	0.0	5/2$^+$			
698.18	(11/2$^-$)	348.2 *1*	42 *4*	349.85	9/2$^-$	D+Q		
		454.7 *3*	14 *4*	243.29	7/2$^-$			
		501.8 *1*	100 *13*	196.245	11/2$^-$			
714.88	(9/2$^+$)	211.5 *2*	61 *10*	503.42	9/2$^+$	[D,E2]	0.11 *7*	
		365.0 *1*	82 *13*	349.85	9/2$^-$	(D)		Mult.: γ(θ) consistent with ΔJ=(0).
		407.4 *2*	100 *13*	307.27	(5/2)$^+$			

$\gamma(^{151}Eu)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	α[@]	Comments
719.18	(7/2+,9/2+)	219.4 *2*	24 *3*	499.70	(7/2+)	[M1,E2]	0.181 *23*	α(K)=0.14 *3*; α(L)=0.029 *5*; α(M)=0.0065 *13*; α(N+..)=0.0017 *3* α(N)=0.0015 *3*; α(O)=0.00022 *3*; α(P)=1.5×10^{-5} *5*
		369.2 *2*	10 *3*	349.85	9/2−			
		412.1 *2*	14 *2*	307.27	(5/2)+			
		475.85 *15*	100 *15*	243.29	7/2−			
		719.3 *3*	24 *7*	0.0	5/2+			
735.01	(≤9/2)	402.9 *2*	58 *13*	332.18	3/2+,5/2+			
		427.35 *15*	100 *13*	307.53	(7/2)+			
		735.2 *3*	32 *10*	0.0	5/2+			
752.38	(13/2+)	241.3 *1*	23 *4*	511.13	(11/2)+	[M1,E2]	0.137 *21*	α(K)=0.110 *24*; α(L)=0.0211 *23*; α(M)=0.0047 *7*; α(N+..)=0.00123 *14* α(N)=0.00106 *13*; α(O)=0.000159 *12*; α(P)=1.1×10^{-5} *4*
		444.5 *1*	100	307.86	(9/2)+	Q		
		556.0[b] *2*		196.245	11/2−			Suggested placement (only by 1995Jo18 in (^{19}F,4nγ), with Iγ=31 *3*) is considered suspect (by evaluator) in view of no such assignments in other reactions where this level is populated fairly intensely.
757.74	3/2+,5/2+	450.6 *2*	19 *3*	307.27	(5/2)+			
		560.6 *3*	14 *2*	196.54	(3/2)+			
		757.9 *2*	100 *10*	0.0	5/2+			
790.1	(7/2,11/2)	482.2 *2*	100	307.86	(9/2)+	D		
807.3	(7/2−)	206.61 *17*	100 *11*	600.74		[D,E2]	0.12 *8*	
		610.3[&b] *3*	<176[&]	196.54	(3/2)+			
		807.5 *5*	40 *13*	0.0	5/2+			
859.4?		552.2[b] *3*	100	307.27	(5/2)+			
881.8	(11/2−)	532.1 *3*		349.85	9/2−	D+Q		
		574.06[b] *18*		307.86	(9/2)+			γ reported only in (n,n′γ). It is considered uncertain by evaluator.
889		889 *1*		0.0	5/2+			
943.2?		441[b] *1*		502.27	15/2−			
946.0	(5/2−,7/2−)	638.1 *3*	100	307.53	(7/2)+			
957.24	19/2−	455.0 *1*	100	502.27	15/2−	E2	0.01725	α(K)=0.01399 *20*; α(L)=0.00255 *4*; α(M)=0.000564 *8*; α(N+..)=0.0001484 *21* α(N)=0.0001277 *18*; α(O)=1.93×10^{-5} *3*; α(P)=1.380×10^{-6} *20*
960.1		610.3[&b] *3*	100[&]	349.85	9/2−			
973.43	(15/2)+	221.1 *1*	6.8 *15*	752.38	(13/2+)	M1+E2	0.177 *23*	α(K)=0.14 *3*; α(L)=0.028 *5*; α(M)=0.0063 *12*; α(N+..)=0.0017 *3* α(N)=0.00143 *25*; α(O)=0.00021 *3*; α(P)=1.4×10^{-5} *5*
		462.2 *1*	100 *5*	511.13	(11/2)+	E2	0.01653	α(K)=0.01342 *19*; α(L)=0.00243 *4*; α(M)=0.000537 *8*; α(N+..)=0.0001413 *20* α(N)=0.0001216 *17*; α(O)=1.84×10^{-5} *3*; α(P)=1.326×10^{-6} *19*
1040.92	17/2−	84.0	7 *2*	957.24	19/2−	[M1,E2]	3.8 *8*	α(K)=2.2 *4*; α(L)=1.3 *9*; α(M)=0.29 *22*; α(N+..)=0.07 *6* α(N)=0.07 *5*; α(O)=0.009 *7*; α(P)=0.00021 *8*
		429.5 *1*	100 *5*	611.42	13/2−	E2	0.0202	α(K)=0.01631 *23*; α(L)=0.00306 *5*; α(M)=0.000678 *10*;

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γ(^{151}Eu) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	α@	Comments
								α(N+..)=0.0001779 *25* α(N)=0.0001533 *22*; α(O)=2.31×10^{-5} *4*; α(P)=1.599×10^{-6} *23*
1040.92	17/2$^-$	538.7 *1*	64 *6*	502.27	15/2$^-$	M1+E2	0.015 *5*	α(K)=0.013 *4*; α(L)=0.0019 *4*; α(M)=0.00041 *8*; α(N+..)=0.000110 *21* α(N)=9.4×10^{-5} *18*; α(O)=1.5×10^{-5} *3*; α(P)=1.3×10^{-6} *5*
1057.18	(15/2$^-$)	359.0 *1*	100 *11*	698.18	(11/2$^-$)			
		445.7 *1*	29 *7*	611.42	13/2$^-$			
		860.9 *1*	51 *7*	196.245	11/2$^-$			
1093.6	(9/2$^+$,11/2$^+$,13/2$^+$)	582.5 *2*	100	511.13	(11/2)$^+$	D+Q		
1114.0	(15/2$^+$)	502.6 *1*	100 *20*	611.42	13/2$^-$	D+Q		
		600 *1*		511.13	(11/2)$^+$			
		611.7 *3*	30 *11*	502.27	15/2$^-$			
1220.75	(17/2$^+$)	247.2 *2*	6.4 *11*	973.43	(15/2)$^+$	(M1+E2)	0.128 *21*	α(K)=0.103 *23*; α(L)=0.0194 *19*; α(M)=0.0043 *6*; α(N+..)=0.00113 *12* α(N)=0.00098 *11*; α(O)=0.000147 *10*; α(P)=1.0×10^{-5} *4*
		468.3 *1*	100 *6*	752.38	(13/2$^+$)	E2	0.01595	α(K)=0.01296 *19*; α(L)=0.00233 *4*; α(M)=0.000515 *8*; α(N+..)=0.0001357 *19* α(N)=0.0001167 *17*; α(O)=1.768×10^{-5} *25*; α(P)=1.283×10^{-6} *18*
		718.6 *2*	16 *4*	502.27	15/2$^-$	D		
1383.24	(17/2$^+$)	881.0 *1*	100	502.27	15/2$^-$	D		
1421		1421 *1*		0.0	5/2$^+$			
1462.64	(19/2$^+$)	421.7 *1*	8 *2*	1040.92	17/2$^-$			
		489.3 *1*	100 *6*	973.43	(15/2)$^+$	Q		
1503.26	(23/2)$^-$	546.0 *1*	100	957.24	19/2$^-$	E2	0.01064	α(K)=0.00875 *13*; α(L)=0.001478 *21*; α(M)=0.000325 *5*; α(N+..)=8.58×10^{-5} *12* α(N)=7.37×10^{-5} *11*; α(O)=1.126×10^{-5} *16*; α(P)=8.78×10^{-7} *13*
1504.69	(19/2$^-$)	447.4 *1*	100 *10*	1057.18	(15/2$^-$)			
		463.7 *1*	13 *3*	1040.92	17/2$^-$			
		1002.6 *1*	28 *4*	502.27	15/2$^-$	(Q)		
1506.93	(19/2$^+$)	286.0 *2*	24 *5*	1220.75	(17/2$^+$)			
		392.9 *1*	11.1 *16*	1114.0	(15/2$^+$)	(Q)		
		466.0 *1*	100 *5*	1040.92	17/2$^-$	(E1)	0.00529	α(K)=0.00452 *7*; α(L)=0.000607 *9*; α(M)=0.0001300 *19*; α(N+..)=3.47×10^{-5} *5* α(N)=2.96×10^{-5} *5*; α(O)=4.65×10^{-6} *7*; α(P)=4.42×10^{-7} *7*
		549.7 *1*	47 *10*	957.24	19/2$^-$			
1563.84	21/2$^-$	59.0 *2*	7 *2*	1504.69	(19/2$^-$)			
		522.9 *1*	100 *4*	1040.92	17/2$^-$	E2	0.01190	α(K)=0.00975 *14*; α(L)=0.001676 *24*; α(M)=0.000369 *6*; α(N+..)=9.73×10^{-5} *14* α(N)=8.36×10^{-5} *12*; α(O)=1.275×10^{-5} *18*; α(P)=9.75×10^{-7} *14*
		606.6 *1*	35 *3*	957.24	19/2$^-$	M1+E2	0.011 *4*	α(K)=0.009 *3*; α(L)=0.0014 *3*; α(M)=0.00030 *6*; α(N+..)=8.0×10^{-5} *17* α(N)=6.8×10^{-5} *14*; α(O)=1.07×10^{-5} *24*; α(P)=1.0×10^{-6} *4*

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$\gamma(^{151}Eu)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	α@	Comments
1719.4	(21/2$^+$)	498.6 1	47 3	1220.75	(17/2$^+$)	E2	0.01348	α(K)=0.01101 16; α(L)=0.00193 3; α(M)=0.000425 6; α(N+..)=0.0001121 16 α(N)=9.64×10^{-5} 14; α(O)=1.465×10^{-5} 21; α(P)=1.097×10^{-6} 16
		762.1 1	100 3	957.24	19/2$^-$	D		
1732.8	(21/2$^+$)	776.0 2	100	957.24	19/2$^-$			
1752.3	(19/2$^+$)	531.6 1	100	1220.75	(17/2$^+$)	D		
1764.9	(21/2$^+$)	807.7 1	100	957.24	19/2$^-$	D		
1803		1803 1		0.0	5/2$^+$			
1948.0	(23/2)$^+$	384.1 1	100 2	1563.84	21/2$^-$	E1	0.00834	α(K)=0.00711 10; α(L)=0.000963 14; α(M)=0.000207 3; α(N+..)=5.51×10^{-5} 8 α(N)=4.70×10^{-5} 7; α(O)=7.35×10^{-6} 11; α(P)=6.87×10^{-7} 10
		441.0 1	31 4	1506.93	(19/2$^+$)	Q		
		444.7 1	30 5	1503.26	(23/2)$^-$	D		Mult.: ΔJ=0, dipole from γγ(θ).
		485.4 1	20 2	1462.64	(19/2$^+$)	Q		
1964.8	(21/2$^+$)	581.5 2	100	1383.24	(17/2$^+$)			
1994.9	(23/2$^-$)	490.2 1	100 5	1504.69	(19/2$^-$)			
		1037.6 1	23 6	957.24	19/2$^-$			
1995.9	(23/2$^+$)	431.9 2	8 2	1563.84	21/2$^-$			
		533.3 1	100 6	1462.64	(19/2$^+$)	Q		
2118.0	(27/2)$^-$	614.7 1	100	1503.26	(23/2)$^-$	E2	0.00790	α(K)=0.00654 10; α(L)=0.001059 15; α(M)=0.000232 4; α(N+..)=6.14×10^{-5} 9 α(N)=5.27×10^{-5} 8; α(O)=8.10×10^{-6} 12; α(P)=6.62×10^{-7} 10
2151.8	25/2$^-$	156.8 2	1.6 4	1994.9	(23/2$^-$)			
		203.7 2	3.6 9	1948.0	(23/2)$^+$			
		588.0 1	100 6	1563.84	21/2$^-$	E2	0.00882	α(K)=0.00729 11; α(L)=0.001198 17; α(M)=0.000262 4; α(N+..)=6.95×10^{-5} 10 α(N)=5.96×10^{-5} 9; α(O)=9.15×10^{-6} 13; α(P)=7.35×10^{-7} 11
		648.5 2	18 5	1503.26	(23/2)$^-$	M1+E2	0.010 3	α(K)=0.0081 23; α(L)=0.00116 25; α(M)=0.00025 6; α(N+..)=6.7×10^{-5} 15 α(N)=5.8×10^{-5} 12; α(O)=9.0×10^{-6} 21; α(P)=9.E−7 3
2170.5	(25/2$^+$)	438.2 2	73 18	1732.8	(21/2$^+$)			
		667.3 1	100 5	1503.26	(23/2)$^-$	D		
2224.3	(23/2$^+$)	472.0 2	37 11	1752.3	(19/2$^+$)			
		505.0 2	100 15	1719.4	(21/2$^+$)			
2237.5	(25/2$^+$)	472.6 2	100	1764.9	(21/2$^+$)			
2275.7	(25/2$^+$)	510.9 1	32 3	1764.9	(21/2$^+$)			
		556.3 1	100 8	1719.4	(21/2$^+$)	Q		
		772.5 1	25 2	1503.26	(23/2)$^-$	D		
2327		2327 1		0.0	5/2$^+$			
2438.3	(27/2)$^+$	286.5 1	50 2	2151.8	25/2$^-$	D		
		320.4 1	9.1 6	2118.0	(27/2)$^-$	E1	0.01299	α(K)=0.01107 16; α(L)=0.001512 22; α(M)=0.000325 5; α(N+..)=8.64×10^{-5} 13 α(N)=7.38×10^{-5} 11; α(O)=1.150×10^{-5} 17; α(P)=1.055×10^{-6} 15
		490.2 1	100 5	1948.0	(23/2)$^+$	Q		
2457.1	(25/2$^+$)	492.1 4	23 11	1964.8	(21/2$^+$)			
		953.8 2	100 8	1503.26	(23/2)$^-$			
2520.6	(27/2$^-$)	350.2 2	8 2	2170.5	(25/2$^+$)			
		525.7 1	100 10	1994.9	(23/2$^-$)			
		1017.3 1	32 4	1503.26	(23/2)$^-$			

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γ(^{151}Eu) (continued)

E$_i$(level)	J$^\pi_i$	E$_\gamma$†	I$_\gamma$†	E$_f$	J$^\pi_f$	Mult.‡	α@	Comments
2535		2535 *1*		0.0	5/2$^+$			
2557.4	(27/2$^+$)	561.5 *1*	100	1995.9	(23/2$^+$)	Q		
2610.8	(27/2$^+$)	172.5 *2*	31 *7*	2438.3	(27/2)$^+$	(M1)	0.396	α(K)=0.335 *5*; α(L)=0.0475 *7*; α(M)=0.01027 *15*; α(N+..)=0.00276 *4* α(N)=0.00235 *4*; α(O)=0.000373 *6*; α(P)=3.70×10^{-5} *6*
		440.7 *3*	8 *3*	2170.5	(25/2$^+$)			
		459.1 *1*	47 *2*	2151.8	25/2$^-$			
		492.7 *1*	26 *5*	2118.0	(27/2)$^-$			
		614.9 *1*	100 *9*	1995.9	(23/2$^+$)	Q		
		662.8 *2*	14 *3*	1948.0	(23/2)$^+$			
2636.3	(29/2)$^+$	197.9 *1*	9 *2*	2438.3	(27/2)$^+$			
		465.9 *1*	22 *3*	2170.5	(25/2$^+$)	(E2)	0.01617	α(K)=0.01314 *19*; α(L)=0.00237 *4*; α(M)=0.000524 *8*; α(N+..)=0.0001379 *20* α(N)=0.0001186 *17*; α(O)=1.80×10^{-5} *3*; α(P)=1.300×10^{-6} *19*
		518.3 *1*	100 *4*	2118.0	(27/2)$^-$	E1	0.00416	α(K)=0.00356 *5*; α(L)=0.000475 *7*; α(M)=0.0001017 *15*; α(N+..)=2.72×10^{-5} *4* α(N)=2.32×10^{-5} *4*; α(O)=3.64×10^{-6} *6*; α(P)=3.49×10^{-7} *5*
2647		2647 *1*		0.0	5/2$^+$			
2659		2659 *1*		0.0	5/2$^+$			
2694		2694 *1*		0.0	5/2$^+$			
2734.8	(27/2$^+$)	459.0 *2*	100 *33*	2275.7	(25/2$^+$)			
		510.6 *3*	60 *20*	2224.3	(23/2$^+$)			
2773.6	(29/2$^+$)	316.4 *3*	7 *3*	2457.1	(25/2$^+$)			
		655.7 *1*	100 *7*	2118.0	(27/2)$^-$	D		
2782.6	(29/2$^-$)	262.0	4.0 *16*	2520.6	(27/2$^-$)			
		344.4 *2*	9 *2*	2438.3	(27/2)$^+$			
		630.8 *1*	100 *5*	2151.8	25/2$^-$	Q		
		664.6 *1*	21 *3*	2118.0	(27/2)$^-$			
2789.7	(31/2)$^-$	671.8 *1*	100	2118.0	(27/2)$^-$	E2	0.00637	α(K)=0.00530 *8*; α(L)=0.000834 *12*; α(M)=0.000182 *3*; α(N+..)=4.83×10^{-5} *7* α(N)=4.14×10^{-5} *6*; α(O)=6.40×10^{-6} *9*; α(P)=5.39×10^{-7} *8*
2834		2834 *1*		0.0	5/2$^+$			
2856.9	(29/2$^+$)	581.2 *1*	100	2275.7	(25/2$^+$)			
2923.5		647.8 *1*	100	2275.7	(25/2$^+$)			
2955.3	(31/2)$^+$	165.6 *1*	1.0 *3*	2789.7	(31/2)$^-$			
		172.7 *1*	11 *2*	2782.6	(29/2$^-$)	(E1)	0.0648	α(K)=0.0549 *8*; α(L)=0.00777 *11*; α(M)=0.001671 *24*; α(N+..)=0.000441 *7* α(N)=0.000378 *6*; α(O)=5.80×10^{-5} *9*; α(P)=4.93×10^{-6} *7*
		517.0 *1*	100 *5*	2438.3	(27/2)$^+$	E2	0.01225	α(K)=0.01004 *14*; α(L)=0.001733 *25*; α(M)=0.000381 *6*; α(N+..)=0.0001006 *15* α(N)=8.65×10^{-5} *13*; α(O)=1.318×10^{-5} *19*; α(P)=1.003×10^{-6} *14*
2990.4	(31/2$^+$)	216.8 *1*	13 *3*	2773.6	(29/2$^+$)			
		379.5 *1*	59 *4*	2610.8	(27/2$^+$)	Q		
		552.1 *1*	100 *4*	2438.3	(27/2)$^+$	Q		
3046.0	(33/2)$^+$	(90.9)		2955.3	(31/2)$^+$			
		256.3 *1*	100 *3*	2789.7	(31/2)$^-$	E1	0.0229	α(K)=0.0195 *3*; α(L)=0.00269 *4*; α(M)=0.000578 *9*; α(N+..)=0.0001534 *22* α(N)=0.0001312 *19*; α(O)=2.03×10^{-5} *3*; α(P)=1.82×10^{-6} *3*
		272.5 *3*	8 *3*	2773.6	(29/2$^+$)			

$^{151}_{63}$Eu$_{88}$-16

γ(^{151}Eu) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	α@	Comments
3046.0	(33/2)+	409.8 *1*	91 *11*	2636.3	(29/2)+	E2	0.0231	α(K)=0.0185 *3*; α(L)=0.00356 *5*; α(M)=0.000789 *11*; α(N+..)=0.000207 *3* α(N)=0.000178 *3*; α(O)=2.68×10^{-5} *4*; α(P)=1.81×10^{-6} *3*
3057.4		939.4 *2*	100	2118.0	(27/2)−			
3089.3	(31/2−)	453.1 *2*	14 *5*	2636.3	(29/2)+			
		568.7 *1*	100 *12*	2520.6	(27/2−)			
3092.5		974.5 *2*	100	2118.0	(27/2)−			
3163.8	(31/2+)	606.4 *1*	100	2557.4	(27/2+)			
3183.3	(33/2+)	192.8 *1*	13 *3*	2990.4	(31/2+)			
		393.5 *1*	100 *3*	2789.7	(31/2)−	D		
		547.1 *2*	52 *22*	2636.3	(29/2)+			
3378.5	(33/2−)	289.2 *1*	12 *2*	3089.3	(31/2−)			
		588.8 *2*	36 *9*	2789.7	(31/2)−			
		595.9 *1*	100 *9*	2782.6	(29/2−)	Q		
3479.8	(35/2+)	489.3 *2*	38 *5*	2990.4	(31/2+)	(Q)		
		524.5 *1*	100 *4*	2955.3	(31/2)+	Q		
3495.0	(33/2+)	638.1 *2*	100	2856.9	(29/2+)			
3497.9	(35/2)−	708.3 *1*	100	2789.7	(31/2)−	E2	0.00562	α(K)=0.00469 *7*; α(L)=0.000727 *11*; α(M)=0.0001583 *23*; α(N+..)=4.21×10^{-5} *6* α(N)=3.60×10^{-5} *5*; α(O)=5.58×10^{-6} *8*; α(P)=4.78×10^{-7} *7*
3509.8		417.3 *2*	100	3092.5				
3529.0	(35/2+)	538.5 *3*	37 *10*	2990.4	(31/2+)	(Q)		
		573.7 *1*	100 *13*	2955.3	(31/2)+	Q		
3544.5	(37/2+)	498.5 *1*	100	3046.0	(33/2)+	(E2)	0.01349	α(K)=0.01102 *16*; α(L)=0.00193 *3*; α(M)=0.000425 *6*; α(N+..)=0.0001122 *16* α(N)=9.64×10^{-5} *14*; α(O)=1.466×10^{-5} *21*; α(P)=1.097×10^{-6} *16*
3772.7	(37/2+)	274.9 *1*	10 *3*	3497.9	(35/2)−			
		589.4 *1*	100 *17*	3183.3	(33/2+)			
3807.5	(35/2+)	643.7 *2*	100	3163.8	(31/2+)			
3838		3838 *1*		0.0	5/2+			
3879.3	(37/2−)	381.5 *1*	35 *3*	3497.9	(35/2)−	(M1)	0.0468	α(K)=0.0397 *6*; α(L)=0.00551 *8*; α(M)=0.001188 *17*; α(N+..)=0.000320 *5* α(N)=0.000272 *4*; α(O)=4.33×10^{-5} *6*; α(P)=4.34×10^{-6} *6*
		500.8 *1*	100 *12*	3378.5	(33/2−)			
3918		3918 *1*		0.0	5/2+			
4119.9	(39/2+)	640.1 *1*	100	3479.8	(35/2+)	Q		
4126.8	(39/2)−	247.5 *2*	32 *6*	3879.3	(37/2−)	(M1+E2)	0.127 *21*	α(K)=0.102 *23*; α(L)=0.0194 *19*; α(M)=0.0043 *5*; α(N+..)=0.00113 *11* α(N)=0.00097 *11*; α(O)=0.000147 *9*; α(P)=1.0×10^{-5} *4*
		628.8 *1*	100 *10*	3497.9	(35/2)−	E2	0.00747	α(K)=0.00620 *9*; α(L)=0.000996 *14*; α(M)=0.000218 *3*; α(N+..)=5.77×10^{-5} *8* α(N)=4.95×10^{-5} *7*; α(O)=7.62×10^{-6} *11*; α(P)=6.28×10^{-7} *9*
4140.6	(39/2+)	611.6 *1*	100	3529.0	(35/2+)			
4185.8	(41/2+)	641.3 *1*	100	3544.5	(37/2+)	Q		
4292.2	(39/2−)	794.3 *1*	100	3497.9	(35/2)−	Q		
4404.1	(41/2+)	631.4 *2*	100	3772.7	(37/2+)			
4460.8	(41/2−)	333.9 *2*	62 *15*	4126.8	(39/2)−			
		581.5 *1*	100 *10*	3879.3	(37/2−)	Q		
4730.6	(43/2−)	603.8 *3*	100	4126.8	(39/2)−			

$^{151}_{63}Eu_{88}$-17

Adopted Levels, Gammas (continued)

$\gamma(^{151}Eu)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f
4807.8	(43/2$^+$)	667.2 *2*	100	4140.6	(39/2$^+$)
4859.1	(43/2$^+$)	739.2 *2*	100	4119.9	(39/2$^+$)
4968.4	(45/2$^+$)	782.6 *2*	100	4185.8	(41/2$^+$)
5663.1	(47/2$^+$)	804.0 *2*	100	4859.1	(43/2$^+$)
5776.9	(49/2$^+$)	808.5 *3*	100	4968.4	(45/2$^+$)

† From weighted averages of all available γ-ray datasets: ^{151}Gd ε decay; ^{136}Xe(^{19}F,4nγ); ^{148}Nd(^{6}Li,3nγ); ^{150}Nd(^{6}Li,5nγ); ^{151}Eu(n,n′γ); Coulomb excitation; ^{152}Sm(p,2nγ) at different energies; ^{152}Sm(d,3nγ) and ^{154}Sm(p,4nγ).

‡ From ce in ^{151}Gd ε decay for γ rays from low-spin levels and from ce and $\gamma\gamma(\theta)$ data for γ rays from high-spin levels populated in ^{136}Xe(^{19}F,4nγ) reaction. The mult=Q is from $\gamma(\theta)$ and/or $\gamma\gamma(\theta)$ data and implies ΔJ=2, stretched quadrupole (most likely E2) transition, where as mult=D (or D+Q) implies ΔJ=1 transition.

From ^{151}Gd ε only.

@ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

& Multiply placed with undivided intensity.

[a] Multiply placed with intensity suitably divided.

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

$^{151}_{63}Eu_{88}$-18

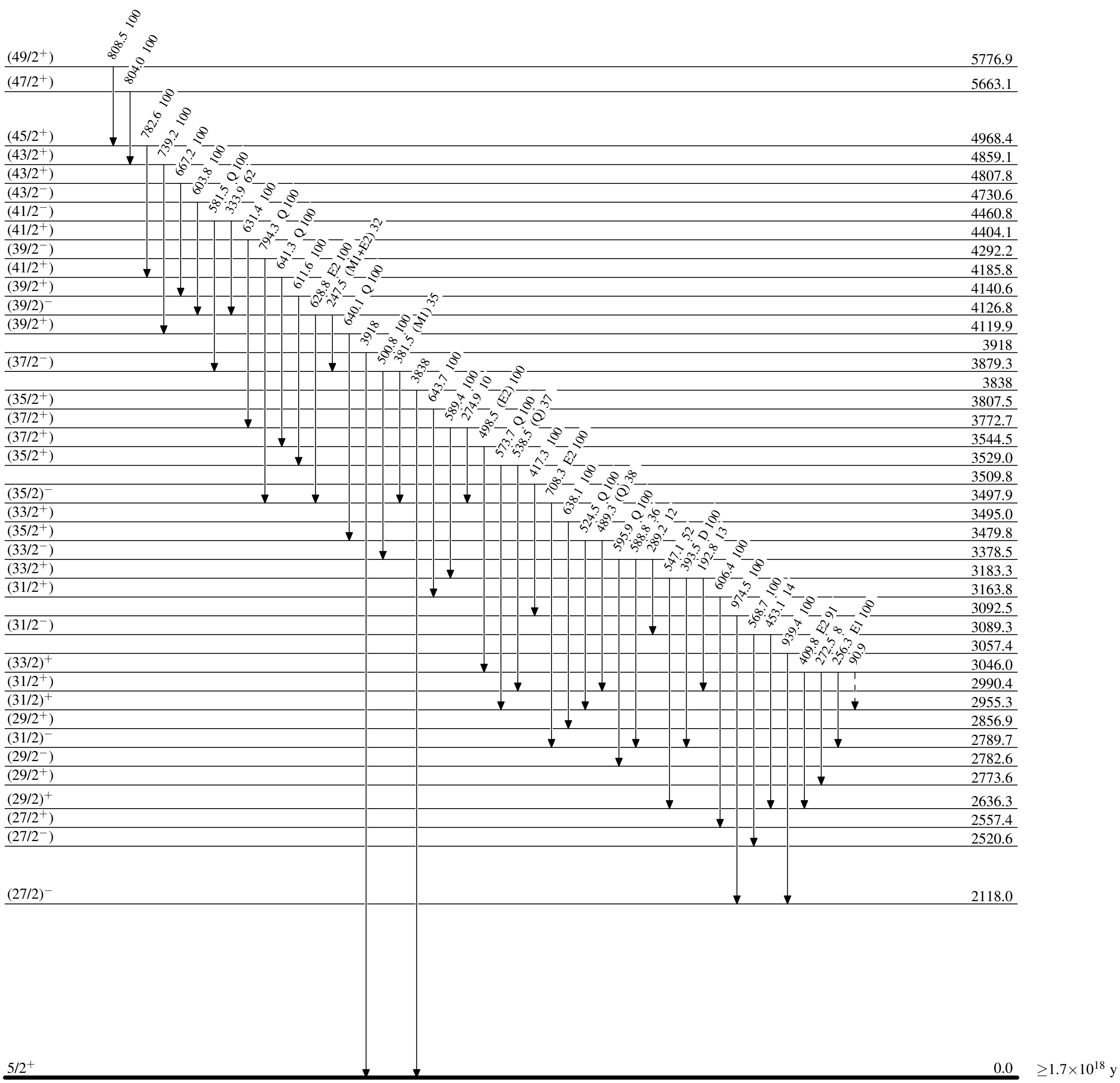
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

- - - - - -▸ γ Decay (Uncertain)

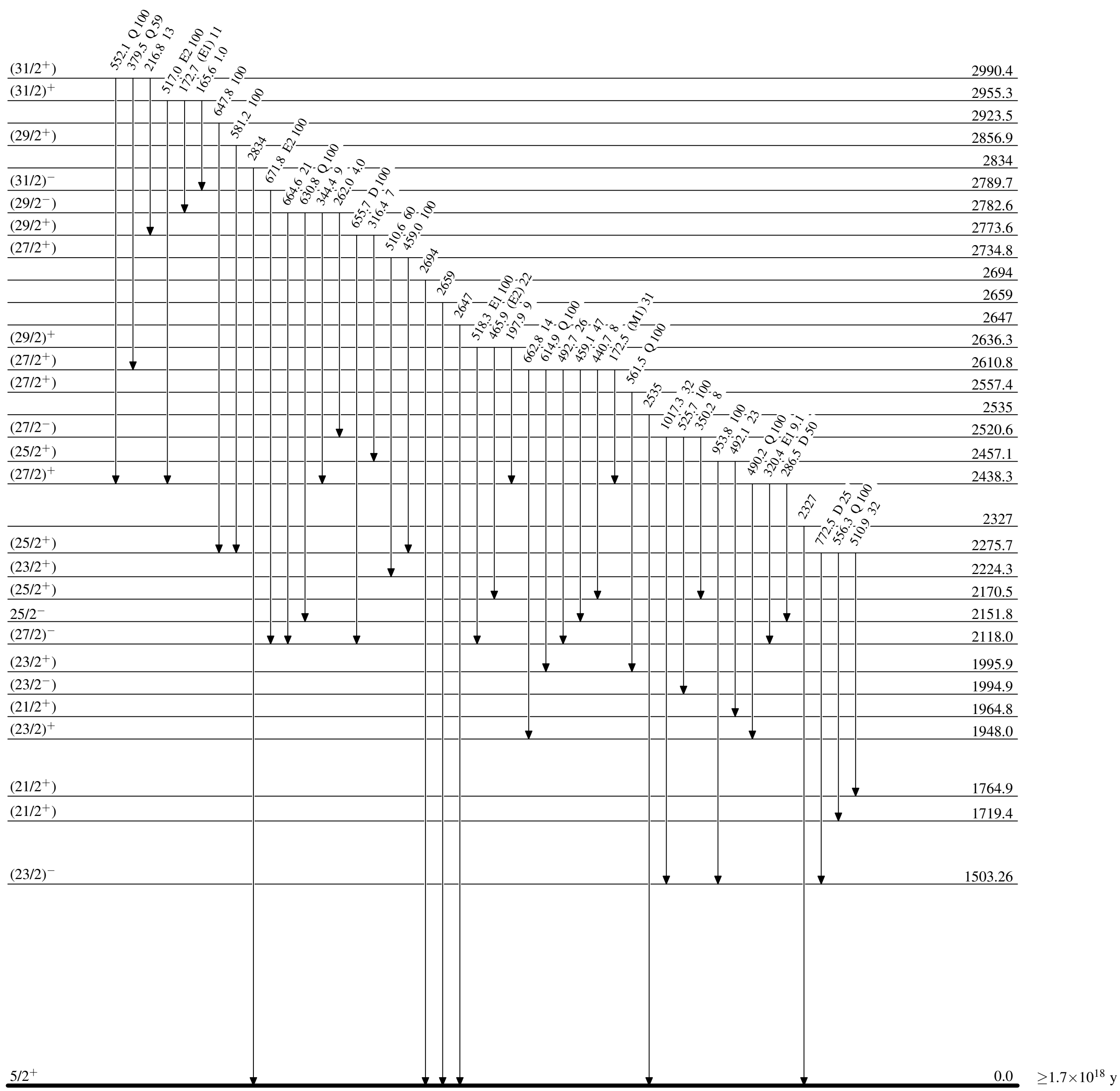


$^{151}_{63}Eu_{88}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

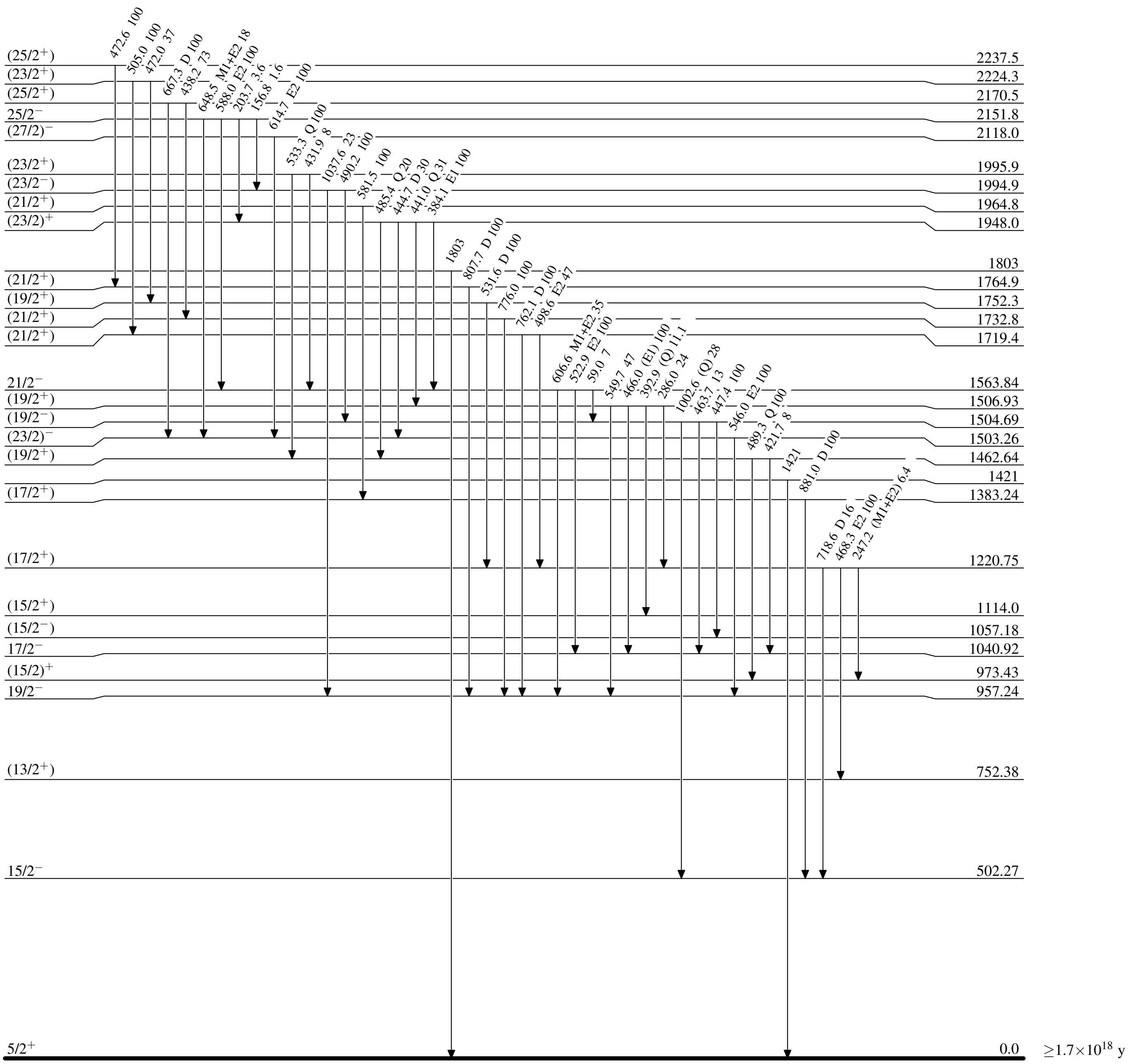


$^{151}_{63}Eu_{88}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{151}_{63}Eu_{88}$

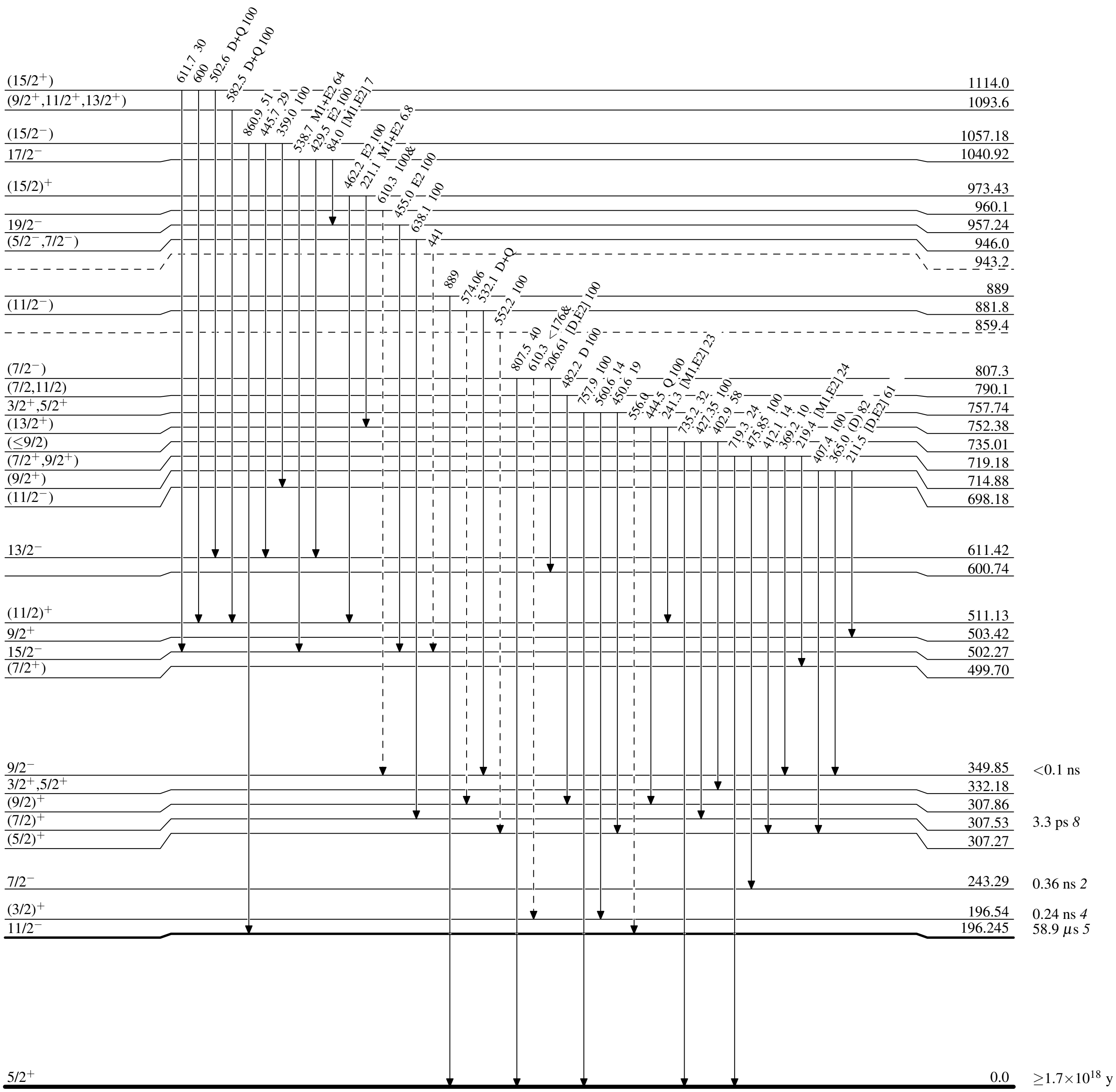
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

- - - - - -► γ Decay (Uncertain)



$^{151}_{63}Eu_{88}$

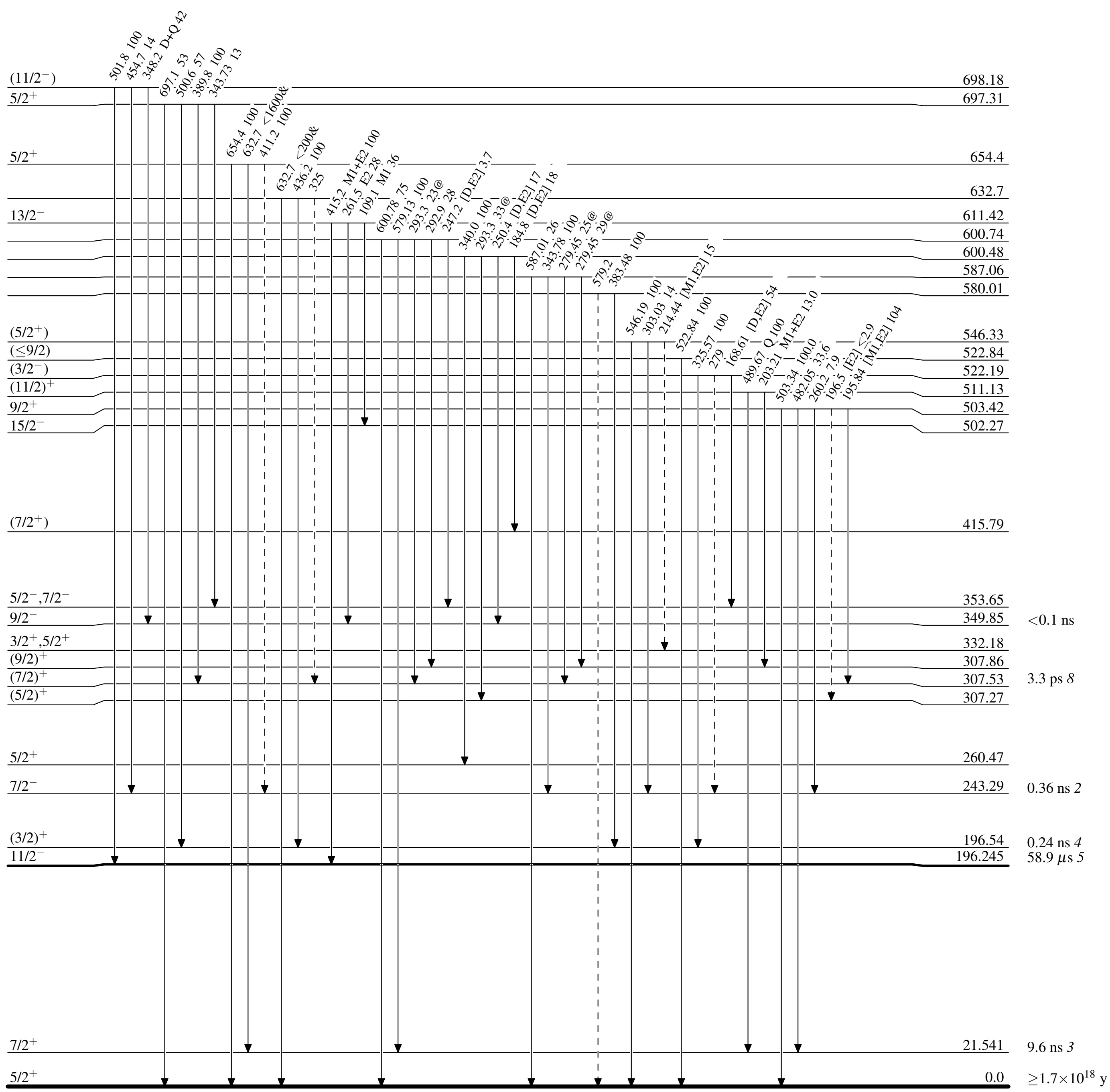
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend

- - - - - -► γ Decay (Uncertain)

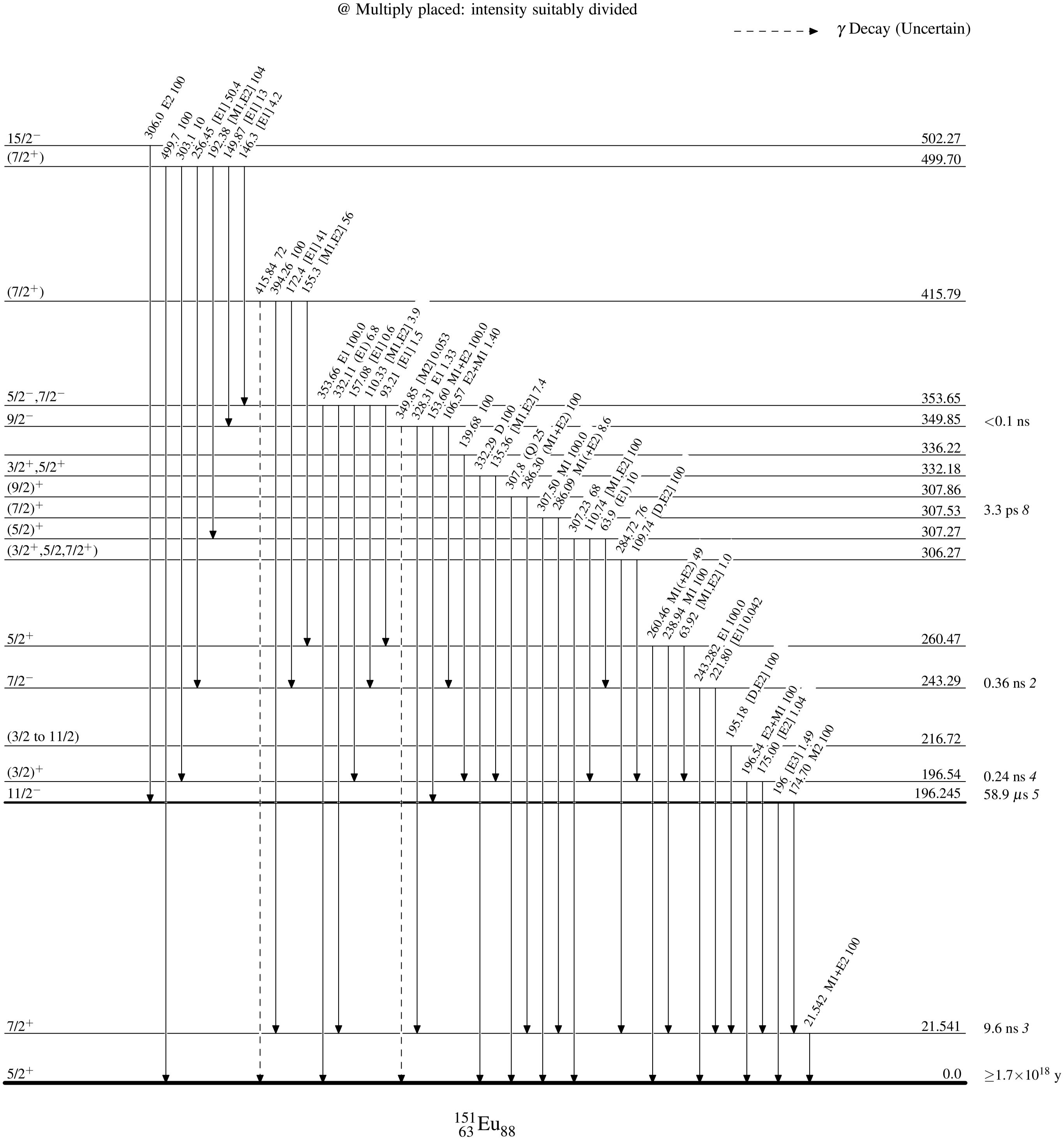


$^{151}_{63}Eu_{88}$

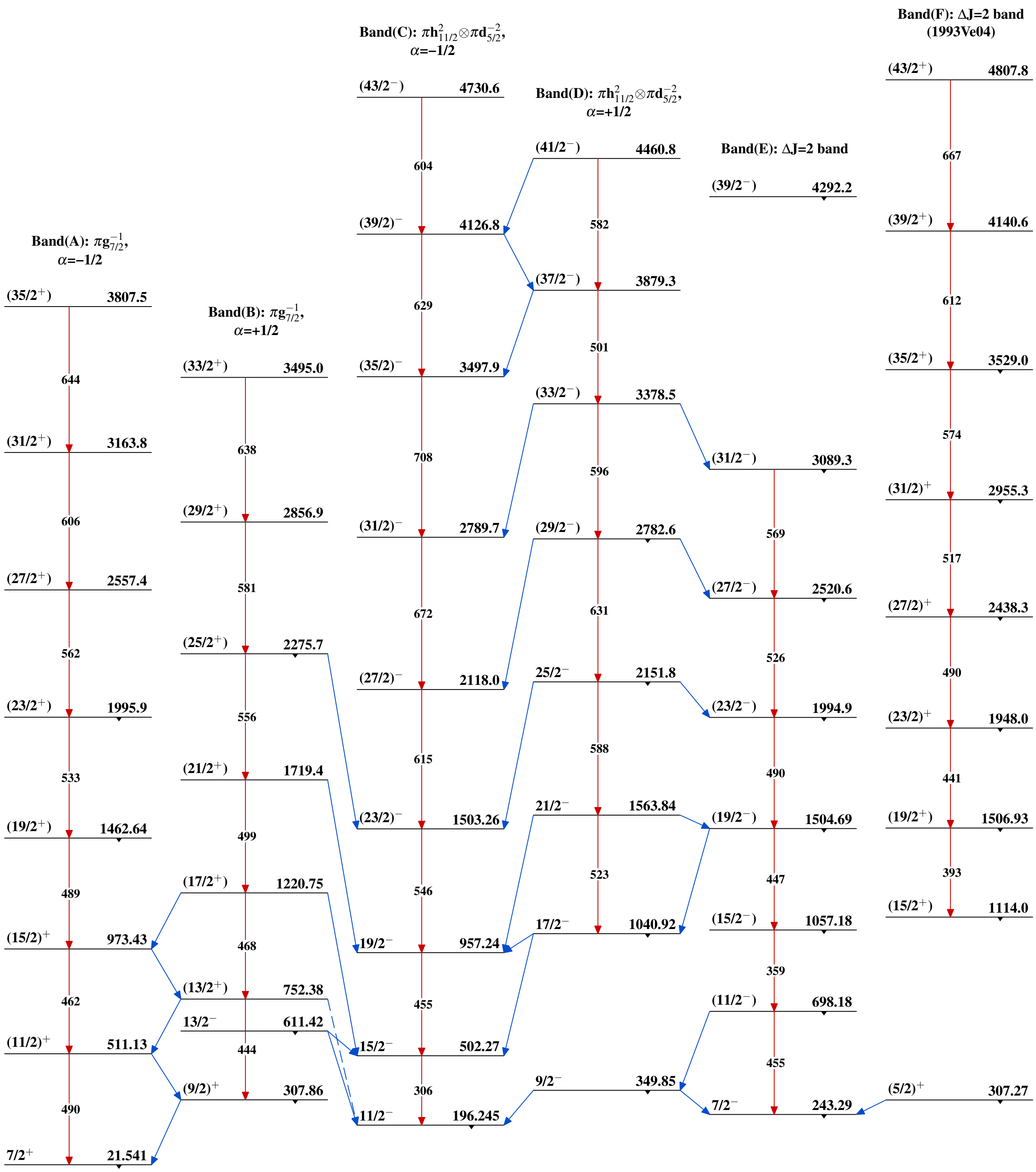
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

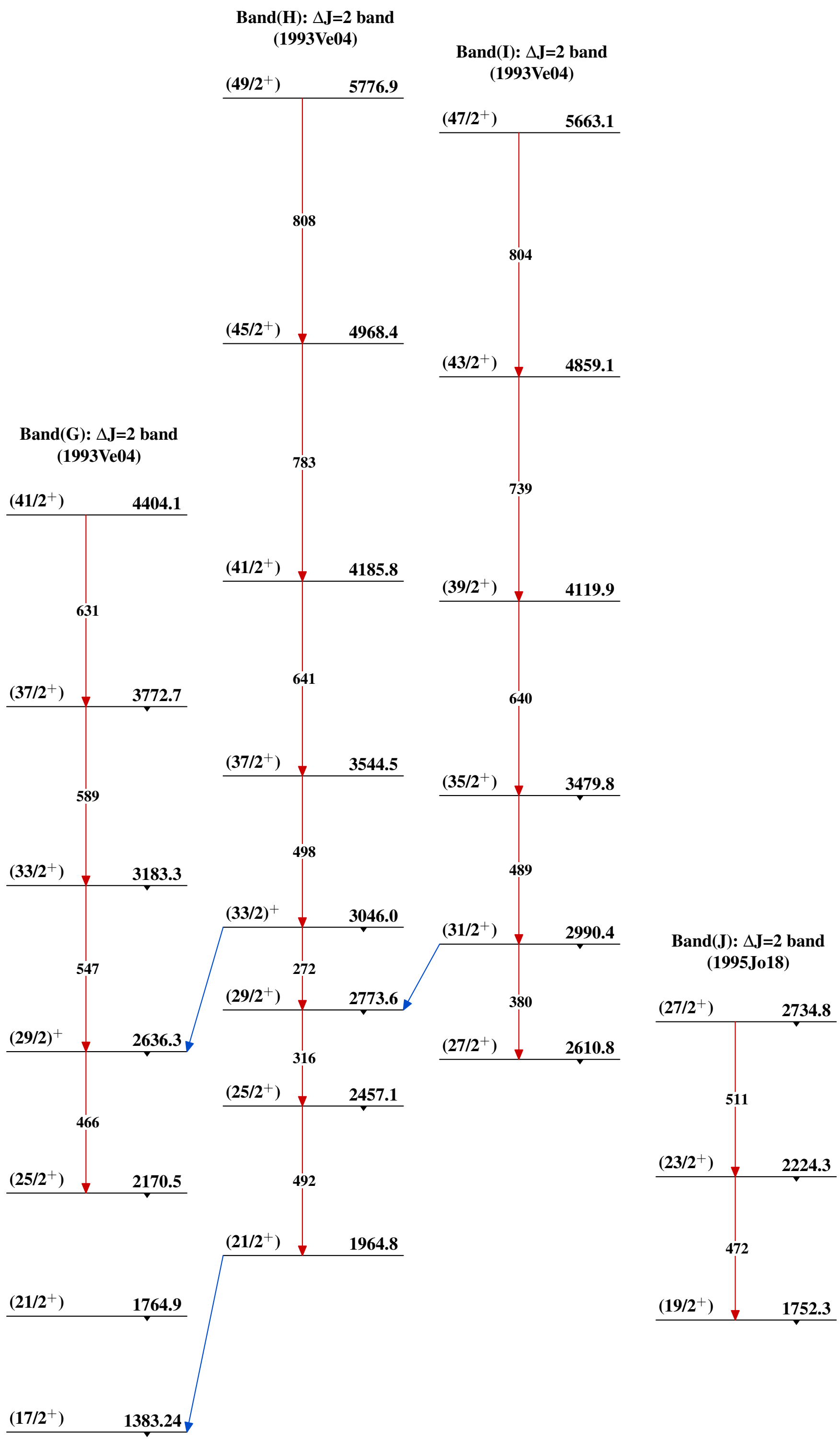


Adopted Levels, Gammas



$^{151}_{63}Eu_{88}$

Adopted Levels, Gammas (continued)



$^{151}_{63}Eu_{88}$