Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	N. Nica and B. Singh	NDS 181, 1 (2022)	9-Mar-2022

Q(β^-)=224.06 *29*; S(n)=7659 *4*; S(p)=5405.0 *6*; Q(α)=1601.3 *15* 2021Wa16
S(2n)=13917.1 *26*, S(2p)=13994 *7* (2021Wa16).
Additional information 1.
Mass measurement: 1975Ka25.
2011Ba04: theoretical calculation of levels, J^π, bands, B(M1), B(E2), spectroscopic factors for pickup and stripping reactions, electrical quadrupole and magnetic dipole moments, using neutron-proton interacting boson-fermion model (IBFM-2) for odd-A Pm isotopes.
Theoretical calculations: consult NSR database at www.nndc.bnl.gov/nsr/ for 12 references dealing with nuclear structure and 16 for radioactivity related calculations.
^{147}Pm nuclide and half-life of ^{147}Nd were evaluated by B. Singh (McMaster University; balraj@mcmaster.ca).

^{147}Pm Levels

Cross Reference (XREF) Flags

A	^{147}Nd β^- decay (11.03 d)	E	^{146}Nd(^{3}He,d)	I	^{148}Sm(d,^{3}He)
B	^{151}Eu α decay (4.6×10^{18} y)	F	^{146}Nd(α,t)	J	^{148}Sm(t,α)
C	^{136}Xe(^{15}N,4nγ)	G	^{148}Nd(p,2nγ)	K	^{150}Sm(p,α)
D	^{146}Nd(pol p,p) IAS	H	^{148}Nd(d,3nγ)		

E(level)[†]	J^π[‡]	$T_{1/2}$	XREF	Comments
0.0[#]	7/2$^+$	2.6234 y *4*	ABC EFGHIJK	%β^-=100 μ=+2.58 *7* (1966Re04,2019StZV) Q=+0.74 *20* (1966Re04,2016St14,2021StZZ) μ,Q: measured by optical spectroscopy (1966Re04). Q=+0.7 *2* in 1966Re04 revised by 2008Py02 and adopted in 2016St14 evaluation. Corrections are discussed in 1964Bl22. Others: Q=0.59 *15* (1966Re04, atomic beam); μ=3.2 *3*, Q=0.7 *3* (1963Bu14, atomic beam); 1992Al03 measured hyperfine structure constants using collinear laser spectroscopy, and moment ratios: g(^{145}Pm g.s.)/g(^{147}Pm g.s.)=2.0208 *51*; and Q(^{145}Pm g.s.)/Q(^{147}Pm g.s.)=0.31 *6* (1992Al03). J^π: spin from atomic beam (1960Ca03,1963Bu14) and optical (1960Kl02) measurements, parity from L(^{3}He,d)=4. Configuration=fragment of $\pi g_{7/2}$ orbital. $T_{1/2}$: weighted average of 2.62346 y *27* (1999Po32, γ-decay curve, 95% confidence level, uncertainty tripled for 1σ in averaging procedure, as no details of this measurement are provided); 2.62 y *1* (1968Re04, 2π proportional counter, 1.9 half-lives, previous value from this group using the same method was 2.50 y *3* in 1961Wy01); 2.62343 y *36* (1967Jo07, calorimetry, ≈0.5 half-life, 95% confidence level, uncertainty doubled for 1σ in averaging procedure, previous value from this lab using the same method was 2.6226 y *20* in 1965Ei04); 2.620 y *5* (1965Wh04, calorimetry, ≈0.4 half-life, previous value from this group was 2.67 y *6* in 1963Ro20); 2.618 y *7* (1965An07, 4$\pi\beta$ proportional counter, 0.5 half-life); 2.60 y *2* (1965Fl02, 2π proportional counter, 1.8 half-lives); 2.7 y *1* (1959Ca12); 2.64 y *2* (1957Me47, 4$\pi\beta$ proportional counter, 1.5 half-lives); 2.66 y *2* (1956Sc87, proportional counter, 1.8 half-lives); 2.52 y *8* (1955Me52, mass spectrometry).
91.1051 *16*	5/2$^+$	2.51 ns *2*	AB EFGHIJK	μ=+3.55 *10* (1970Ba39,2020StZV) Q=+0.6 *3* (1970Ba39,1989Ra17) XREF: B(?).

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Adopted Levels, Gammas (continued)

^{147}Pm Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$	XREF	Comments
				μ: Mossbauer spectroscopy (1970Ba39, also 1970NoZW) using g-factor(91.1 level)/g-factor(g.s.)=1.925 *4*. Others: +3.22 *16* (1980Ne07, TDPAC using ^{147}Nd source); 3.8 *6* from IPAC and 3.4 *10* from DPAC (1976Si08), 3.9 *7* (1972Si49, IPAC). Q: from measured Q(91.1 level)/Q(g.s.)=0.8 *4* (1970Ba39, also 1970NoZW), Mossbauer spectroscopy. Note that this value is listed in 1989Ra17 compilation, but not in 2016St14 and 2021StZZ evaluations. J^{π}: L(^{3}He,d)=2; M1+E2 γ to $7/2^+$ g.s. Configuration=fragment of & $\pi d_{5/2}$ orbital. $T_{1/2}$: from βγ(t) in ^{147}Nd β^- decay, weighted average of several measurements. Other: 2.6 ns *2* from γγ(t) in (p,2nγ) (1977Ko24).
340 *10*	$3/2^+,5/2^+$		I	J^{π}: L(d,^{3}He)=2.
380 *10*	$3/2^+,5/2^+$		I	J^{π}: L(d,^{3}He)=2.
408.14[#] *3*	$9/2^+$		A C G	J^{π}: M1+E2 γ to $7/2^+$ g.s.; E1 γ from $11/2^-$, 649.
410.515 *9*	$3/2^+$	0.139 ns *14*	A EFGH J	J^{π}: M1+E2 γ to $5/2^+$, 91; E2 γ to $7/2^+$ g.s. Combined analysis of γγ(θ) and γ(θ,H,T) for 276γ and 410γ data gives best possible choice of 3/2 for 410 level and 5/2 for 686 level in β^- decay (1977Al34). $T_{1/2}$: from γγ(t) in ^{147}Nd β^- decay (1975Si01).
489.259 *17*	$7/2^+$		A FGHiJ	XREF: F(?). J^{π}: M1+E2 γ to $5/2^+$, 91; M1(+E2) γ to $7/2^+$ g.s. Configuration=fragment of $\pi g_{7/2}$ orbital.
530.998 *9*	$5/2^+$	0.093 ns *20*	A GHiJ	J^{π}: M1+E2 γ to $5/2^+$, 91; analysis of 440γ(θ,H,T) data by 1977Al34 in β^- decay. Configuration=fragment of $\pi d_{5/2}$ orbital. $T_{1/2}$: from βγ(t) in ^{147}Nd β^- decay, weighted average of 0.083 ns *15* (1967Ra20) and 0.133 ns *30* (1971Si20).
632.89 *5*	$1/2^+$		A eFG ij	J^{π}: L(^{3}He,d)=0.
641.15 *8*	$(5/2)^+$		A G i	J^{π}: ΔJ=1, M1(+E2) γ to $(3/2)^+$, 411.
649.30[&] *14*	$11/2^-$	27 ns *3*	C eFG ijK	%IT=100 J^{π}: L=5 in ^{146}Nd(^{3}He,d); M2 γ to $7/2^+$ g.s.; $\pi h_{11/2}$ excitation in weakly deformed ^{147}Pm; systematics of $h_{11/2}$ isomers in odd-A Pm nuclei: 26 ns in ^{143}Pm at 960 keV, 18 ns in ^{145}Pm at 795 keV, 35 μs in ^{149}Pm at 496 keV. $T_{1/2}$: from γγ(t) in ^{136}Xe(^{15}N,4nγ) (1995Ur01). Other: 12 ns *2* from γγ(t) in (p,2nγ) (1977Ko24).
667.15[#] *8*	$11/2^+$		C G	J^{π}: ΔJ=2, E2 γ to $7/2^+$ g.s.; E2+M1 γ to $9/2^+$, 408.
680.433 *20*	$7/2^+$		A G i	J^{π}: M1+E2 γs to $7/2^+$, g.s., and $9/2^+$, 408; β feeding from $5/2^-$ parent not first-forbidden unique from log *ft* value.
685.900 *12*	$5/2^+$	0.25 ns *10*	A EFGHiJ	J^{π}: M1+E2 γs to $7/2^+$, g.s. and $5/2^+$, 91; L(^{3}He,d)=(2) and possible $d_{5/2}$ orbital. Combined analysis of γγ(θ) and γ(θ,H,T) for 276γ and 410γ data gives best possible choice of 3/2 for 410 level and 5/2 for 686 level in β^- decay (1977Al34). Configuration=fragment of $\pi d_{5/2}$ orbital. $T_{1/2}$: from βγ(t) in ^{147}Nd β^- decay (1971Si20).
730.68 *13*	$(9/2)^+$		GH J	J^{π}: E2 γ to $5/2^+$, 91; M1+E2 γ to $7/2^+$, 489.
732 *4*	$(3/2^+,5/2^+)$		EF i	E(level),J^{π}: L(^{3}He,d)=(2) suggests it is a different level from 730.7 level which from (d,3nγ) results seems to be higher spin.
806 *4*	$3/2^+,5/2^+$		EF J	J^{π}: L(^{3}He,d)=2.
807.26 *13*	$5/2^-,7/2^-$		A GH	J^{π}: E1 γs to $5/2^+$, 91, and $7/2^+$, g.s.
865.11 *19*	$(7/2^-,9/2^-)$		G	J^{π}: possible (E1) γ to $7/2^+$ g.s.; γ to $9/2^+$.
882 *4*	$3/2^+,5/2^+$		EF IJ	J^{π}: L(^{3}He,d)=2.
932 *4*	$1/2^+$		E	J^{π}: L(^{3}He,d)=0.
940 *10*	$3/2^+,5/2^+$		I	J^{π}: L(d,^{3}He)=2.

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Adopted Levels, Gammas (continued)

^{147}Pm Levels (continued)

E(level)[†]	J^{π}[‡]	XREF	Comments
970.17[@] *14*	11/2⁻	C G	J^{π}: ΔJ=1, E1 γ to 9/2⁺, 408; γ to 11/2⁺, 667; γ from 13/2⁺, 1072.
975 *4*	(7/2⁻)	E	J^{π}: L=(3) from $\sigma(^3He,d)/\sigma(\alpha,t)$, possible $f_{7/2}$ orbital.
984.0 *3*	(5/2,9/2)	G	J^{π}: ΔJ=1 γ to 7/2⁺ g.s.; γ to 9/2⁺, 408 level.
1041.15 *17*	3/2⁺,5/2⁺	EFG J	J^{π}: L(^{3}He,d)=2.
1049.0 *4*	(5/2⁺ to 9/2⁺)	GH	J^{π}: γs to (5/2)⁺, 531 and 686 levels.
1051.16[&] *15*	15/2⁻	C G	J^{π}: ΔJ=2, E2 γ to 11/2⁻, 649; band member.
1072.45[#] *12*	13/2⁺	C G	J^{π}: ΔJ=2, E2 γ to 9/2⁺, 408; ΔJ=1, M1+E2 γ to 11/2⁺, 667.
1077.50 *16*	(11/2)⁺	GH	J^{π}: M1 γ to (9/2)⁺, 731; γ to 7/2⁺, 489.
1100 *4*	1/2⁺	E	J^{π}: L(^{3}He,d)=0.
1119.2 *4*	(7/2⁺,9/2⁺,11/2⁺)	G	J^{π}: γ to 11/2⁺, 667; γ to 7/2⁺, 680.
1145 *4*	(3/2⁺,5/2⁺)	E	J^{π}: L(^{3}He,d)=(2).
1159.36[@] *11*	13/2⁻	C G	J^{π}: ΔJ=1, E1 γ to 11/2⁺, 667; M1+E2 γ to 11/2⁻, 970.
1186 *4*		F J	
1213.8 *4*	(3/2,5/2,7/2)⁻	E G	J^{π}: E1 γ to (5/2)⁺, 641.
1245.74 *16*	(11/2,13/2)⁻	C G	J^{π}: M1+E2 γ to 11/2⁻, 649.
1313 *4*		EF	
1325 *4*		J	
1346 *4*	3/2⁺,5/2⁺	EF iJ	J^{π}: L(^{3}He,d)=2.
1350 *10*	9/2⁻,11/2⁻	i	J^{π}: L(d,^{3}He)=2+5; L=2 component is assumed for 1346 level.
1377 *4*	1/2⁺	EF	J^{π}: L(^{3}He,d)=0.
1382.0 *5*		FG	XREF: F(1387).
1392.76[#] *14*	15/2⁺	C G	J^{π}: ΔJ=2, E2 γ to 11/2⁺, 667; γ to 13/2⁻, 1159.
1406.18[@] *14*	15/2⁻	C G	J^{π}: ΔJ=1, E1 γ to 13/2⁺, 1072; ΔJ=1, M1 γ to 13/2⁻ 1160; γ to 11/2⁻, 970.
1422 *4*		E	
1434.2 *3*	(13/2⁺)	GH J	J^{π}: γ to (9/2)⁺, 731; γ to (11/2)⁺, 1077.
1440 *4*		E	
1477 *4*	(7/2⁺)	EF J	J^{π}: L(^{3}He,d)=(4), possible $g_{7/2}$ orbital.
1505 *4*		J	
1546 *4*		E J	
1580		I	
1588 *4*	3/2⁺,5/2⁺	E i	J^{π}: L(^{3}He,d)=2.
1596 *4*	11/2⁻,9/2⁻	F i	XREF: F(?). E(level),J^{π}: doublet at 1600 keV with L=2+5 in (d,^{3}He); L=2 is assumed for the 1588 component.
1627.75[&] *16*	19/2⁻	C G	J^{π}: ΔJ=2, Q γ to 15/2⁻, 1051; band member.
1630 *4*	3/2⁺,5/2⁺	EF	J^{π}: L(^{3}He,d)=2.
1643 *4*		F J	
1656 *4*	(3/2⁺,5/2⁺)	E i	J^{π}: L(^{3}He,d)=(2).
1659.45[@] *14*	17/2⁻	C	J^{π}: ΔJ=1, M1+E2 γ to 15/2⁻, 1406; ΔJ=1, E1 γ to 15/2⁺, 1393; ΔJ=(2), (Q) γ to 13/2⁻; band member.
1667 *4*	11/2⁻,9/2⁻	iJ	E(level),J^{π}: doublet at 1660 keV with L=2+5 in (d,^{3}He); L=2 is assumed for the 1656 component.
1699.00 *22*	(15/2⁺,17/2⁻)	C	J^{π}: γ to 15/2⁻, 1051; γ from 19/2$^{(+)}$, 2079; γ to (11/2,13/2)⁻, 1246.
1703 *4*	(11/2⁻)	EF	J^{π}: L(^{3}He,d)=(5); possible $h_{11/2}$ orbital.
1723		J	
1788 *4*	3/2⁺,5/2⁺	EF	XREF: F(?). J^{π}: L(^{3}He,d)=2.
1794.74 *21*	(15/2⁻,17/2⁻)	C	J^{π}: γ to 19/2⁻, 1628; γ to 15/2⁻, 1051; γ to (11/2⁻,13/2⁻), 1246.
1805		J	
1831.71[#] *17*	17/2⁺	C	J^{π}: ΔJ=(2), (Q) γ to 13/2⁺, 1072; γ to 15/2⁻, 1406; γ to 15/2⁺, 1393; band member.
1832 *4*		E I	XREF: I(1820). E(level),J^{π}: doublet at 1820 keV with L=1+2 in (d,^{3}He) giving 1/2⁻,3/2⁻ for one component and 3/2⁺,5/2⁺ for the other.

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Adopted Levels, Gammas (continued)

^{147}Pm Levels (continued)

E(level)[†]	J^π[‡]	XREF	Comments
1872 *4*		E	
1892 *4*	(1/2$^+$)	EF	XREF: F(?). J^π: L(^{3}He,d)=(0).
1910 *4*		J	
1930 *4*	1/2$^+$	EF	J^π: L(^{3}He,d)=0.
1938 *4*		J	
1984.50[@] *17*	19/2$^-$	C	J^π: ΔJ=2, Q γ to 15/2$^-$, 1406; γ to 17/2$^-$, 1659; γ to 17/2$^+$, 1832.
2011 *4*	(3/2$^+$,5/2$^+$)	E	J^π: L(^{3}He,d)=(2).
2025 *4*		J	
2035 *4*		EF	XREF: F(?).
2069 *4*	(7/2$^+$)	EF	J^π: L(^{3}He,d)=(4); possible $g_{7/2}$ orbital.
2079.10 *15*	19/2$^{(+)}$	C	J^π: ΔJ=2, Q γ to 15/2$^+$, 1393; ΔJ=(0), dipole γ to 19/2$^-$, 1627; γ to 17/2$^-$, 1659.
2108 *4*	(3/2$^+$,5/2$^+$)	EF J	J^π: L(^{3}He,d)=(2).
2159 *4*		E J	
2180 *4*		E	
2201 *4*		J	
2220 *4*		E	
2250.57[#] *19*	(19/2$^+$)	C	J^π: γ to 15/2$^+$, 1393; γ to 17/2$^-$, 1659; γ to 17/2$^+$, 1832; band member.
2307.97[@] *19*	(21/2$^-$)	C	J^π: γ to 17/2$^-$, 1659; γ to 19/2$^-$, 1984; γ to (19/2$^+$), 2079; band member.
2330.37[&] *17*	23/2$^-$	C	J^π: ΔJ=2, Q γ to 19/2$^-$, 1628; band member.
2405.45[c] *20*	(23/2$^-$)	C	J^π: ΔJ=2 Q γ to 19/2$^-$, 1628.
2459.54[#] *21*	(21/2$^+$)	C	J^π: γ to 17/2$^+$, 1832; γ to 19/2$^-$, 1984; γ to (19/2$^+$), 2250; band member.
2548.92 *18*	(23/2$^-$)	C	J^π: ΔJ=2 Q γ to 19/2$^-$, 1628; ΔJ=1, (M1+E2) γ to (23/2$^-$), 2405.
2622.80 *17*	(23/2$^+$)	C	J^π: ΔJ=2, Q γ to 19/2$^+$, 2079 level; γ to 23/2$^-$, 2330.
2685.98[c] *18*	(25/2$^-$)	C	J^π: ΔJ=1, (M1+E2) γ to 23/2$^-$, 2330 level.
2706.80[@] *25*	(23/2$^-$)	C	J^π: ΔJ=2, Q γ to 19/2$^-$, 1984; γ to 21/2$^-$, 2308; band member.
2782.77[#] *23*	(23/2$^+$)	C	J^π: γ to (19/2$^+$), 2079 level; γ to (21/2$^+$), 2459; band member.
2850.08[d] *17*	(27/2$^-$)	C	J^π: ΔJ=2, Q γ to 23/2$^-$, 2330 level; ΔJ=1, (M1+E2) γ to (25/2$^-$), 2686.
2899.35 *18*	(25/2$^+$)	C	J^π: ΔJ=1 dipole γ to 23/2$^-$, 2330; γ to (23/2$^+$), 2623.
3051.1[#] *4*	(25/2$^+$)	C	J^π: γ to (21/2$^+$), 2459; band member.
3052.3[@] *3*	(25/2$^-$)	C	J^π: γ to 21/2$^-$, 2308; γ to (23/2$^-$), 2707; band member.
3124.49[&] *19*	27/2$^-$	C	J^π: ΔJ=2, Q γ to 23/2$^-$; band member.
3277.49[a] *18*	(27/2$^+$)	C	J^π: ΔJ=2, Q γ to (23/2$^+$), 2623; γ to (25/2$^+$), 2899.
3335.8[@] *4*	(27/2$^-$)	C	J^π: γ to (23/2$^-$), 2706; band member.
3357.85[b] *18*	(29/2$^+$)	C	J^π: M1+E2 γ to (27/2$^+$), 3277; ΔJ=2, Q γ to (25/2$^+$), 2899; ΔJ=1 dipole γ to 27/2$^-$, 3124.
3405.08[c] *25*	(29/2$^-$)	C	J^π: ΔJ=2, Q γ to (25/2$^-$), 2686.
3463.77[d] *19*	(31/2$^-$)	C	J^π: ΔJ=2, Q γ to (27/2$^-$), 2830; γ to (29/2$^-$), 3405.
3611.1 *4*	(27/2 to 31/2$^-$)	C	J^π: γ to (27/2$^-$), 2850.
3687.37[a] *18*	(31/2$^+$)	C	J^π: ΔJ=2, (E2) γ to (27/2$^+$), 3277; ΔJ=1, (M1+E2) γ to (29/2$^+$), 3358; γ to (31/2$^-$), 3464.
3694.90[b] *19*	(33/2$^+$)	C	J^π: ΔJ=2, (E2) γ to (29/2$^+$), 3358; ΔJ=1 dipole γ to (31/2$^-$), 3464.
3840.3[c] *3*	(33/2$^-$)	C	J^π: γ to (29/2$^-$), 3405; γ to (31/2$^-$), 3464.
3949.4[&] *4*	(31/2$^-$)	C	J^π: ΔJ=2, (Q) γ to 27/2$^-$, 3124.
≈4.0×10^3	(9/2$^+$)	I	J^π: L(d,^{3}He)=4 with most probable $g_{9/2}$ orbital.
4133.1 *4*	(29/2 to 33/2$^+$)	C	J^π: γ to (29/2$^+$), 3358.
4229.1[d] *3*	(35/2$^-$)	C	J^π: ΔJ=2, Q γ to (31/2$^-$), 3464.
4286.98[a] *20*	(35/2$^+$)	C	J^π: ΔJ=2, Q γ to (31/2$^+$), 3687; γ to (33/2$^+$), 3695.
4320.51[b] *21*	(37/2$^+$)	C	J^π: ΔJ=2, Q γ to (33/2$^+$), 3695.
4512.5[c] *4*	(37/2$^-$)	C	J^π: γ to (33/2$^-$), 3840; member of ΔJ=2 sequence of levels.

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Adopted Levels, Gammas (continued)

^{147}Pm Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
4857.6[d] 4	(39/2−)	C	Jπ: γ to (35/2−), 4229; member of ΔJ=2 sequence of levels.
5013.21[b] 24	(41/2+)	C	Jπ: ΔJ=2, Q γ to (37/2+), 4320.
5021.28[a] 23	(39/2+)	C	Jπ: ΔJ=2, Q γ to (35/2+), 4287.
5218.2 4	(39/2+,41/2+)	C	Jπ: γ to (37/2+), 4320; γ from (43/2+).
5458.5 4	(37/2 to 41/2+)	C	Jπ: γ to (37/2+), 4320.
5645.3[b] 3	(45/2+)	C	Jπ: ΔJ=2, Q γ to (41/2+), 5013.
5808.2[a] 4	(43/2+)	C	Jπ: ΔJ=2, (Q) γ to (39/2+), 5021.
5985.1 3	(43/2)	C	Jπ: ΔJ=1 γ to (41/2+), 5013.
6130.2 4	(41/2 to 45/2+)	C	Jπ: γ to (41/2+), 5013.
6185.7 5	(43/2 to 47/2+)	C	Jπ: γ to (43/2+), 3808.
6377.9[b] 3	(47/2+)	C	Jπ: ΔJ=1, D+Q γ to (45/2+), 5645 ; γ to (43/2), 5985.
6687.2 3	(49/2+)	C	Jπ: ΔJ=1 γ from (51/2+), 7004; ΔJ=(2), (Q) γ to (45/2+), 5645.
7004.1[b] 3	(51/2+)	C	Jπ: ΔJ=2, Q γ to (47/2+), 6378.
7554.2 4	(51/2+)	C	Jπ: ΔJ=1, D+Q γ to (49/2+), 6687.
7779.8?[b] 5		C	Jπ: (51/2,53/2,55/2+) from possible γ to (51/2+), 7004.
7977.5? 5		C	Jπ: (51/2,53/2,55/2+) from possible γ to (51/2+), 7004.

† From least-squares fit to Eγ values for levels populated in γ-ray studies. For levels populated in particle-transfer studies only, averages of available values are taken.

‡ Assignments for high-spin (J>11/2) levels above ≈1.7 MeV for are essentially from 1995Ur01 in ^{136}Xe(^{15}N,4nγ) and are based on γγ(θ)(DCO) data, treating all ΔJ=2 transitions as stretched quadrupole, ΔJ=1 pure dipole as E1 and ΔJ=1, mixed D+Q as M1+E2 transitions. In addition, ascending spins are assumed as the excitation energy rises, and band associations are considered.

\# Band(A): ΔJ=1 band based on g.s. This band and the band based on 11/2− exhibit alternating parity structure.

@ Band(a): ΔJ=1 band based on 11/2−. This band and g.s. band exhibit alternating parity structure.

& Band(B): ΔJ=2, $\pi h_{11/2}$ band.

a Band(C): ΔJ=2 band based on (27/2+).

b Band(D): ΔJ=2 band based on (29/2+).

c Seq.(E): ΔJ=2 γ cascade based on (23/2−).

d Seq.(F): DJ=2 γ cascade based on (27/2−).

$\gamma(^{147}Pm)$

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]	α[a]	Comments
91.1051	5/2+	91.1050[#] 16	100	0.0	7/2+	M1+E2	+0.089 5	2.03	α(K)=1.714 24; α(L)=0.249 4; α(M)=0.0534 8 B(M1)(W.u.)=0.00378 9; B(E2)(W.u.)=2.01 23 Mult.: based on α(K)exp in ^{147}Nd β^- decay. δ: from γ(θ,H,T) in ^{147}Nd β^- decay. 91γ probability for emission of two K-electrons in internal conversion (relative to one K-electron emission): 1.86×10^{-3} 9 (2003Vi13).
408.14	9/2+	408.15 5	100	0.0	7/2+	M1+E2	+0.57 3	0.0304	E_γ: weighted average of 408.20 7 (p,2nγ) and 408.34 18 (β^-). Mult.,δ: based on α(K)exp and γ(θ) in ^{148}Nd(p,2nγ).
410.515	3/2+	319.410[#] 12	100.0[#] 8	91.1051	5/2+	M1+E2	−0.38 2	0.0607	B(M1)(W.u.)=0.0038 4; B(E2)(W.u.)=3.0 4 Mult.: based on α(K)exp and γ(θ) in β^- decay and (p,2nγ). δ: ^{147}Nd β^- decay (1977Kr13). Other: −0.34 7 (1977Ko24) in (p,2nγ).
		410.52[#] 3	5.45[#] 9	0.0	7/2+	E2		0.0212	B(E2)(W.u.)=0.37 4 Mult.: based on α(K)exp and γ(θ,H) in ^{147}Nd β^- decay.
489.259	7/2+	81.13[#] 8	0.08[#] 2	408.14	9/2+	[M1+E2]		3.8 11	
		398.140[#] 32	100.0[#] 12	91.1051	5/2+	M1+E2	+0.30 1	0.0345 5	E_γ: weighted average of 398.130 16 (β^-) and 398.24 5 (p,2nγ). Mult.,δ: based on α(K)exp and γ(θ) in ^{148}Nd(p,2nγ). Other: +0.30 4 in β^- decay.
		489.27[#] 3	16.4[#] 5	0.0	7/2+	M1+E2	−0.79 +23−45	0.0179 18	Mult.: from ce data in ^{147}Nd β^- decay and (p,2nγ). δ: from γ(θ,H,T) in ^{147}Nd β^- decay. Value is consistent with ce data.
530.998	5/2+	120.483[#] 9	2.81[#] 3	410.515	3/2+	M1+E2	+0.048 21	0.911	B(M1)(W.u.)=0.0033 +9−6; B(E2)(W.u.)=0.3 +4−2 Mult.: based on α(K)exp in ^{147}Nd β^- decay. δ: from γγ(θ) and γ(θ,H,T) in ^{147}Nd β^- decay.
		439.875[#] 17	9.18[#] 8	91.1051	5/2+	M1+E2	+0.62 5	0.0247 5	B(M1)(W.u.)=0.00016 +4−3; B(E2)(W.u.)=0.19 5 Mult.: from ce data in ^{147}Nd β^- decay. δ: from γγ(θ) and γ(θ,H,T) in ^{147}Nd β^- decay.
		531.012[#] 18	100.0[#] 10	0.0	7/2+	M1+E2	−0.40 3	0.0162 3	B(M1)(W.u.)=0.00117 +33−21; B(E2)(W.u.)=0.37 +12−8 Mult.: from ce data in ^{147}Nd β^- decay. δ: from γ(θ,H,T) in ^{147}Nd β^- decay.
632.89	1/2+	222.27[#b] 6	12.3[#] 34	410.515	3/2+	[M1+E2]		0.154 12	
		541.79[#] 5	100[#] 7	91.1051	5/2+	[E2]		0.00994	
641.15	(5/2)+	230.64 8	100	410.515	3/2+	M1(+E2)		0.138 13	E_γ: weighted average of 230.59 5 in ^{147}Nd β^- decay

$\gamma(^{147}$Pm) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]	α[a]	Comments
									and 230.77 *8* in (p,2nγ). Mult.: based on α(K)exp and $\gamma(\theta)$ in ^{148}Nd(p,2nγ).
649.30	11/2$^-$	241.2[@] *2*	100[@] *9*	408.14	9/2$^+$	E1		0.0248	B(E1)(W.u.)=5.1×10^{-7} *9* Mult.: based on α(K)exp and K/L in p,2nγ).
		649.2[@] *3*	22.3[@] *19*	0.0	7/2$^+$	M2		0.0298	B(M2)(W.u.)=0.064 *11* Mult.: based on α(K)exp and K/L in (p,2nγ).
667.15	11/2$^+$	259.01[@] *8*	20.6[@] *20*	408.14	9/2$^+$	E2+M1	+7.4 *6*	0.0868	Mult.,δ: based on α(K)exp and $\gamma(\theta)$ in (p,2nγ).
		667.2[@] *2*	100[@] *6*	0.0	7/2$^+$	E2		0.00589	Mult.: based on α(K)exp and $\gamma(\theta)$ in (p,2nγ).
680.433	7/2$^+$	149.39[#] *6*	9.2[#] *10*	530.998	5/2$^+$	[M1+E2]		0.52 *3*	
		191.19[#] *6*	9.5[#] *10*	489.259	7/2$^+$	[M1+E2]		0.243 *9*	
		272.30 *4*	30.4[#] *7*	408.14	9/2$^+$	M1+E2	+0.10 *3*	0.0962	E_γ: weighted average of 272.30 *4* (β^-) and 272.2 *2* (p,2nγ). Mult.: from ce data in ^{147}Nd β^- decay. δ: from $\gamma\gamma(\theta)$ in ^{147}Nd β^- decay.
		589.35[#] *3*	100.0[#] *29*	91.1051	5/2$^+$	(M1,E2)		0.011 *3*	Mult.: from ce data in ^{147}Nd β^- decay.
		680.40 *4*	41.6[#] *20*	0.0	7/2$^+$	M1+E2		0.0074 *18*	E_γ: from ^{147}Nd β^- decay. Other: 679.9 *3* in (p,2nγ). Mult.: based on α(K)exp in ^{148}Nd(p,2nγ).
685.900	5/2$^+$	53.1[#] *2*	0.09[#] *5*	632.89	1/2$^+$	[E2]		25.1 *6*	B(E2)(W.u.)=39 *+37−20*
		154.91[#] *5*	0.77[#] *6*	530.998	5/2$^+$	[M1+E2]		0.466 *18*	B(M1)(W.u.)<1.3×10^{-4}; B(E2)(W.u.)<2.9
		196.64[#] *3*	21.9[#] *4*	489.259	7/2$^+$	M1+E2	−0.22 *10*	0.231	B(M1)(W.u.)=9×10^{-4} *+6−3*; B(E2)(W.u.)=0.6 *+9−4* Mult.: from ce data in ^{147}Nd β^- decay. δ: from $\gamma\gamma(\theta)$ and $\gamma(\theta$,H,T) in ^{147}Nd β^- decay.
		275.388[#] *15*	96.0[#] *18*	410.515	3/2$^+$	M1+E2	+0.109 *7*	0.0931	B(M1)(W.u.)=0.0015 *+10−5*; B(E2)(W.u.)=0.13 *+9−4* Mult.: from ce data in ^{147}Nd β^- decay. δ: from $\gamma\gamma(\theta)$ and $\gamma(\theta$,H,T) in ^{147}Nd β^- decay. Other: −0.21 *3* in (p,2nγ), note opposite sign.
		594.796[#] *21*	29.5[#] *3*	91.1051	5/2$^+$	E2(+M1)	≥6	0.00790 *13*	B(E2)(W.u.)=0.071 *28*; B(M1)(W.u.)<2.0×10^{-6} Mult.: from ce data in ^{147}Nd β^-. δ: from $\gamma\gamma(\theta)$ and $\gamma(\theta$,H,T) in ^{147}Nd β^- decay (1977Al34). Uncertainty in B(E2)(W.u.) is mainly from 40% uncertainty in level half-life.
		685.882[#] *28*	100.0[#] *18*	0.0	7/2$^+$	M1+E2	−0.97 *30*	0.0073 *7*	B(M1)(W.u.)=5.3×10^{-5} *+42−19*; B(E2)(W.u.)=0.059 *+41−26* Mult.: from ce data in ^{147}Nd β^- decay. δ: from $\gamma(\theta$,H,T) in ^{147}Nd β^- decay.
730.68	(9/2)$^+$	241.4[@] *3*	85[@] *18*	489.259	7/2$^+$	M1+E2		0.121 *13*	α(K)=0.098 *16*; α(L)=0.0180 *25*; α(M)=0.0039 *7* α(N)=0.00088 *13*; α(O)=0.000125 *12*; α(P)=5.8×10^{-6} *15* Mult.: based on α(K)exp in (p,2nγ) and (d,3nγ).

$\gamma(^{147}Pm)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	α[a]	Comments
730.68	(9/2)+	639.60[@] 15	100[@] 8	91.1051	5/2+	E2	0.00653	Mult.: based on α(K)exp in (p,2nγ).
807.26	5/2−,7/2−	318.0[@] 3	33[@] 8	489.259	7/2+			Mult.: based on α(K)exp in (p,2nγ).
		716.2[@] 2	100[@] 10	91.1051	5/2+	E1	0.00189	
		807.2[@] 2	90[@] 10	0.0	7/2+	E1	1.49×10^{-3}	Mult.: based on α(K)exp in (p,2nγ).
865.11	(7/2−,9/2−)	457.0[@] 5	39[@] 8	408.14	9/2+			
		865.1[@] 2	100[@] 9	0.0	7/2+	(E1)	1.30×10^{-3}	Mult.: based on α(K)exp in (p,2nγ); E2 is less likely but not ruled out.
970.17	11/2−	302.9 3	28 12	667.15	11/2+			E_γ,I_γ: seen in (^{15}N,4nγ) but not in (p,2nγ).
		562.0[@] 2	100[@] 8	408.14	9/2+	E1	0.00317	Mult.: based on α(K)exp in (p,2nγ).
		970.3[b] 5	60 12	0.0	7/2+	[M2]	0.00986	E_γ,I_γ: seen in (p,2nγ) but not in (^{15}N,4nγ).
984.0	(5/2,9/2)	576.0[@] 5	31[@] 8	408.14	9/2+			
		983.9[@] 3	100[@] 12	0.0	7/2+	D		
1041.15	3/2+,5/2+	630.6[@] 2	100[@] 8	410.515	3/2+			
		950.2[@] 4	69[@] 14	91.1051	5/2+			
		1041.1[@] 5	69[@] 14	0.0	7/2+			
1049.0	(5/2+ to 9/2+)	363.1[@] 4	100[@] 25	685.900	5/2+			
		518.1[@] 5	80[@] 20	530.998	5/2+			
1051.16	15/2−	401.85[@] 8	100	649.30	11/2−	E2	0.0226	
1072.45	13/2+	102.2 3	4.4 22	970.17	11/2−	[E1]	0.252	
		405.34[@] 12	63 11	667.15	11/2+	M1+E2	0.028 6	
		664.3[@] 3	100 11	408.14	9/2+	E2	0.00596	Mult.,δ: E2+M1, δ=+2.0 3 in (p,2nγ).
1077.50	(11/2)+	346.81[@] 10	100[@] 10	730.68	(9/2)+	M1	0.0508	Mult.: based on α(K)exp in (p,2nγ).
		588.1[@] 4	63[@] 12	489.259	7/2+			Mult.: (E2) in (d,3nγ) is not adopted here (α(K)exp not given).
1119.2	(7/2+,9/2+,11/2+)	438.8[@] 4	100[@] 25	680.433	7/2+			
		452.0[@] 5	60[@] 15	667.15	11/2+			
1159.36	13/2−	189.0 3	19 5	970.17	11/2−	M1+E2	0.252 8	
		492.2 1	100 9	667.15	11/2+	E1	0.00427	
1213.8	(3/2,5/2,7/2)−	572.6[@] 3	100	641.15	(5/2)+	E1	0.00305	Mult.: based on α(K)exp in (p,2nγ).
1245.74	(11/2,13/2)−	194.57[@] 5	55[@] 5	1051.16	15/2−			
		596.6[@] 4	100[@] 24	649.30	11/2−	M1+E2	0.010 3	
1382.0		971.5[@] 5	100	410.515	3/2+			
1392.76	15/2+	233.4 3	13 3	1159.36	13/2−			
		320.3 3	15 5	1072.45	13/2+			
		725.6[@] 3	100 11	667.15	11/2+	E2	0.00483	
1406.18	15/2−	246.8 2	100 17	1159.36	13/2−	M1	0.1252	Mult.: from ce and DCO data in (^{15}N,4nγ) (1995Ur01).
		333.8 2	83 17	1072.45	13/2+	E1	0.01080	

$^{147}_{61}Pm_{86}$-8

Adopted Levels, Gammas (continued)

$\gamma(^{147}Pm)$ (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	α[a]	Comments
1406.18	$15/2^-$	436.1 *3*	33 *8*	970.17	$11/2^-$			
1434.2	$(13/2^+)$	356.5& *3*	50& *20*	1077.50	$(11/2)^+$			
		703.7& *3*	100& *30*	730.68	$(9/2)^+$			Mult.: (E2) adopted in (d,3nγ) is not adopted here (α(K)exp not given).
1627.75	$19/2^-$	576.6 *1*	100	1051.16	$15/2^-$	Q		
1659.45	$17/2^-$	253.2 *2*	66 *13*	1406.18	$15/2^-$	M1+E2	0.105 *12*	
		266.7 *2*	75 *16*	1392.76	$15/2^+$	E1	0.0191	
		500.0 *2*	100 *13*	1159.36	$13/2^-$	(Q)		
1699.00	$(15/2^+,17/2^-)$	453.0 *3*	89 *33*	1245.74	$(11/2,13/2)^-$			
		648.0 *3*	100 *33*	1051.16	$15/2^-$			
1794.74	$(15/2^-,17/2^-)$	167.0 *3*	36 *14*	1627.75	$19/2^-$			
		548.9 *3*	71 *29*	1245.74	$(11/2,13/2)^-$			
		743.6 *3*	100 *21*	1051.16	$15/2^-$			
1831.71	$17/2^+$	425.5 *3*	64 *18*	1406.18	$15/2^-$			
		439.0 *3*	18 *9*	1392.76	$15/2^+$			
		759.3 *3*	100 *27*	1072.45	$13/2^+$	(Q)		
1984.50	$19/2^-$	153.0 *3*	17 *8*	1831.71	$17/2^+$			
		325.0 *3*	75 *13*	1659.45	$17/2^-$			
		578.5 *2*	100 *17*	1406.18	$15/2^-$	Q		
2079.10	$19/2^{(+)}$	284.3 *3*	48 *8*	1794.74	$(15/2^-,17/2^-)$			
		380.0 *3*	18 *8*	1699.00	$(15/2^+,17/2^-)$			
		419.5 *3*	30 *8*	1659.45	$17/2^-$			
		451.4 *2*	100 *13*	1627.75	$19/2^-$	D		
		686.3 *2*	55 *15*	1392.76	$15/2^+$	Q		
2250.57	$(19/2^+)$	419.0 *3*	25 *8*	1831.71	$17/2^+$			
		591.0 *3*	75 *17*	1659.45	$17/2^-$			
		857.8 *3*	100 *25*	1392.76	$15/2^+$			
2307.97	$(21/2^-)$	228.8 *3*	15 *5*	2079.10	$19/2^{(+)}$			
		323.5 *3*	45 *10*	1984.50	$19/2^-$			
		648.5 *2*	100 *20*	1659.45	$17/2^-$			
2330.37	$23/2^-$	702.6 *1*	100	1627.75	$19/2^-$	Q		
2405.45	$(23/2^-)$	777.7 *2*	100	1627.75	$19/2^-$	Q		
2459.54	$(21/2^+)$	209.0 *3*	100 *29*	2250.57	$(19/2^+)$			
		475.5 *3*	86 *29*	1984.50	$19/2^-$			
		627.5 *3*	43 *14*	1831.71	$17/2^+$			
2548.92	$(23/2^-)$	143.6 *2*	20 *4*	2405.45	$(23/2^-)$	(M1+E2)	0.59 *4*	
		218.4 *3*	7.8 *21*	2330.37	$23/2^-$			
		921.2 *1*	100 *6*	1627.75	$19/2^-$	Q		
2622.80	$(23/2^+)$	292.4 *3*	20 *5*	2330.37	$23/2^-$			
		543.7 *1*	100 *7*	2079.10	$19/2^{(+)}$	Q		
2685.98	$(25/2^-)$	137.0 *3*	3.6 *9*	2548.92	$(23/2^-)$	(M1+E2)	0.69 *6*	
		280.4 *2*	6.2 *11*	2405.45	$(23/2^-)$			
		355.6 *1*	100 *3*	2330.37	$23/2^-$	(M1+E2)	0.040 *8*	

$^{147}_{61}Pm_{86}$-9

Adopted Levels, Gammas (continued)

γ(^{147}Pm) (continued)

E$_i$(level)	J^{π}_i	E$_\gamma$[†]	I$_\gamma$[†]	E$_f$	J^{π}_f	Mult.[‡]	α[a]
2706.80	(23/2$^-$)	398.8 3	64 21	2307.97	(21/2$^-$)		
		722.4 3	100 21	1984.50	19/2$^-$	Q	
2782.77	(23/2$^+$)	323.4 3	100 25	2459.54	(21/2$^+$)		
		532.2 3	88 38	2250.57	(19/2$^+$)		
		703.5 3	100 25	2079.10	19/2$^{(+)}$		
2850.08	(27/2$^-$)	164.1 1	100.0 25	2685.98	(25/2$^-$)	(M1+E2)	0.389 9
		301.2 1	26.0 12	2548.92	(23/2$^-$)	(E2)	0.0536
		519.7 1	14.3 15	2330.37	23/2$^-$	Q	
2899.35	(25/2$^+$)	276.4 3	15 4	2622.80	(23/2$^+$)		
		569.0 1	100 9	2330.37	23/2$^-$	D	
3051.1	(25/2$^+$)	591.6 3	100	2459.54	(21/2$^+$)		
3052.3	(25/2$^-$)	345.6 3	32 11	2706.80	(23/2$^-$)		
		744.3 3	100 21	2307.97	(21/2$^-$)		
3124.49	27/2$^-$	794.1 1	100	2330.37	23/2$^-$	Q	
3277.49	(27/2$^+$)	378.1 3	4 2	2899.35	(25/2$^+$)		
		654.7 1	100 16	2622.80	(23/2$^+$)	Q	
3335.8	(27/2$^-$)	629.0 3	100	2706.80	(23/2$^-$)		
3357.85	(29/2$^+$)	80.3 3	13 3	3277.49	(27/2$^+$)	M1+E2	4.0 11
		233.3 2	40 4	3124.49	27/2$^-$	D	
		458.5 1	47 5	2899.35	(25/2$^+$)	Q	
		507.8 1	100 7	2850.08	(27/2$^-$)	D	
3405.08	(29/2$^-$)	718.9 2	100	2685.98	(25/2$^-$)	Q	
3463.77	(31/2$^-$)	(58.9)		3405.08	(29/2$^-$)	[M1+E2]	11.9 48
		613.7 1	100	2850.08	(27/2$^-$)	Q	
3611.1	(27/2 to 31/2$^-$)	761.0 3	100	2850.08	(27/2$^-$)		
3687.37	(31/2$^+$)	223.6 3	21 5	3463.77	(31/2$^-$)		
		329.5 1	100 9	3357.85	(29/2$^+$)	(M1+E2)	0.049 9
		409.9 1	88 18	3277.49	(27/2$^+$)	(E2)	0.0213
3694.90	(33/2$^+$)	231.1 1	100 3	3463.77	(31/2$^-$)	D	
		337.1 1	30.9 16	3357.85	(29/2$^+$)	(E2)	0.0379
3840.3	(33/2$^-$)	377.0 3	12 4	3463.77	(31/2$^-$)		
		435.0 2	100 20	3405.08	(29/2$^-$)		
3949.4	(31/2$^-$)	824.9 3	100	3124.49	27/2$^-$	(Q)	
4133.1	(29/2 to 33/2$^+$)	775.3 3	100	3357.85	(29/2$^+$)		
4229.1	(35/2$^-$)	765.3 2	100	3463.77	(31/2$^-$)	Q	
4286.98	(35/2$^+$)	592.2 3	13 3	3694.90	(33/2$^+$)		
		599.6 1	100 16	3687.37	(31/2$^+$)	Q	
4320.51	(37/2$^+$)	625.6 1	100	3694.90	(33/2$^+$)	Q	
4512.5	(37/2$^-$)	672.2 2	100	3840.3	(33/2$^-$)		
4857.6	(39/2$^-$)	628.5 2	100	4229.1	(35/2$^-$)		
5013.21	(41/2$^+$)	692.7 1	100	4320.51	(37/2$^+$)	Q	
5021.28	(39/2$^+$)	734.3 1	100	4286.98	(35/2$^+$)	Q	
5218.2	(39/2$^+$,41/2$^+$)	897.6 3	100	4320.51	(37/2$^+$)		

$\gamma(^{147}Pm)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]
5458.5	(37/2 to 41/2$^+$)	1138.0 *3*	100	4320.51	(37/2$^+$)	
5645.3	(45/2$^+$)	632.1 *1*	100	5013.21	(41/2$^+$)	Q
5808.2	(43/2$^+$)	590.0 *3*	33 *16*	5218.2	(39/2$^+$,41/2$^+$)	
		787.0 *3*	100 *33*	5021.28	(39/2$^+$)	(Q)
5985.1	(43/2)	972.0 *2*	100	5013.21	(41/2$^+$)	D
6130.2	(41/2 to 45/2$^+$)	1117.0 *3*	100	5013.21	(41/2$^+$)	
6185.7	(43/2 to 47/2$^+$)	377.5 *3*	100	5808.2	(43/2$^+$)	
6377.9	(47/2$^+$)	393.0 *3*	8 *3*	5985.1	(43/2)	
		732.5 *1*	100 *10*	5645.3	(45/2$^+$)	D+Q
6687.2	(49/2$^+$)	1041.8 *1*	100	5645.3	(45/2$^+$)	(Q)
7004.1	(51/2$^+$)	316.9 *2*	55 *13*	6687.2	(49/2$^+$)	D
		626.3 *2*	100 *25*	6377.9	(47/2$^+$)	Q
7554.2	(51/2$^+$)	550.0[b] *3*	50 *30*	7004.1	(51/2$^+$)	
		867.0 *3*	100 *30*	6687.2	(49/2$^+$)	D+Q
7779.8?		775.7 *3*	100	7004.1	(51/2$^+$)	
7977.5?		973.4 *3*	100	7004.1	(51/2$^+$)	

† For gamma rays from high-spin (J>13/2) levels, values are from ^{136}Xe(^{15}N,4nγ), unless otherwise noted.

‡ Based on ce data in ^{147}Nd β^- decay, ^{148}Nd(p,2nγ) and ^{148}Nd(d,3nγ); $\gamma(\theta)$ data in (p,2nγ) and $\gamma\gamma(\theta)$(DCO) ratios in ^{136}Xe(^{15}N,4nγ). Exceptions are noted.

From ^{147}Nd β^- decay.

@ From ^{148}Nd(p,2nγ).

& From ^{148}Nd(d,3nγ).

a 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.

b Placement of transition in the level scheme is uncertain.

$^{147}_{61}Pm_{86}$-11

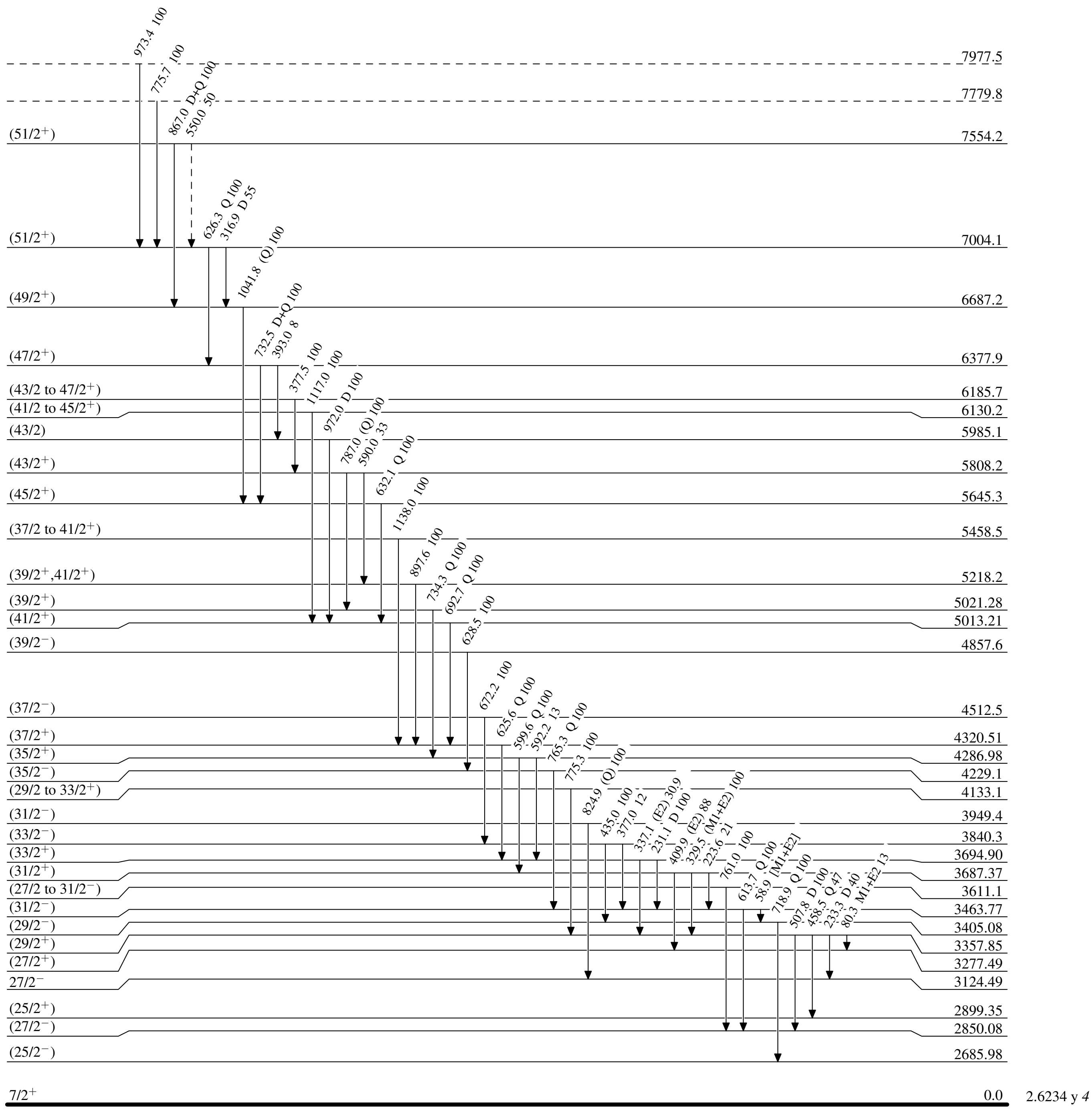
Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level

Legend

γ Decay (Uncertain)

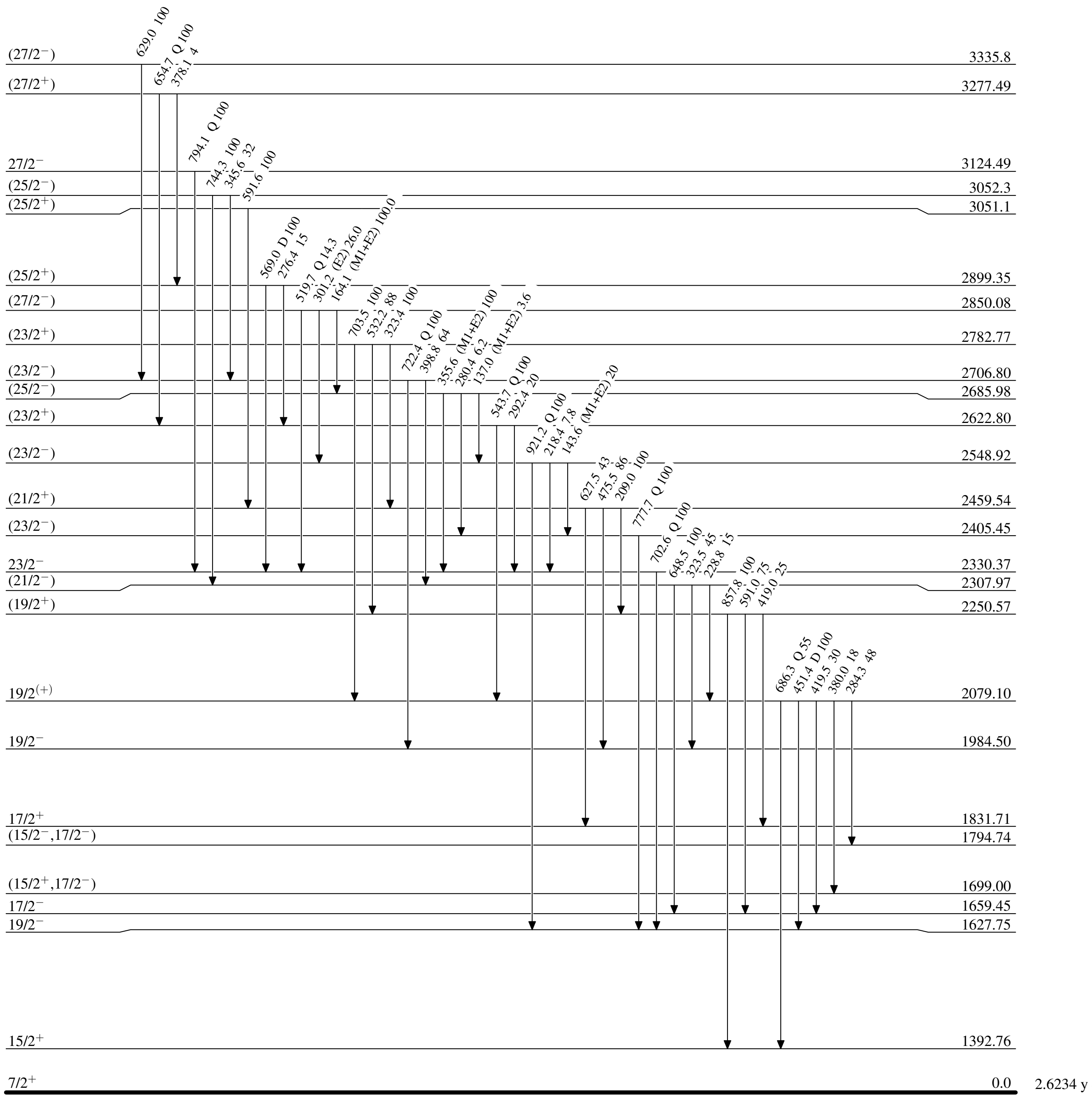


$^{147}_{61}Pm_{86}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

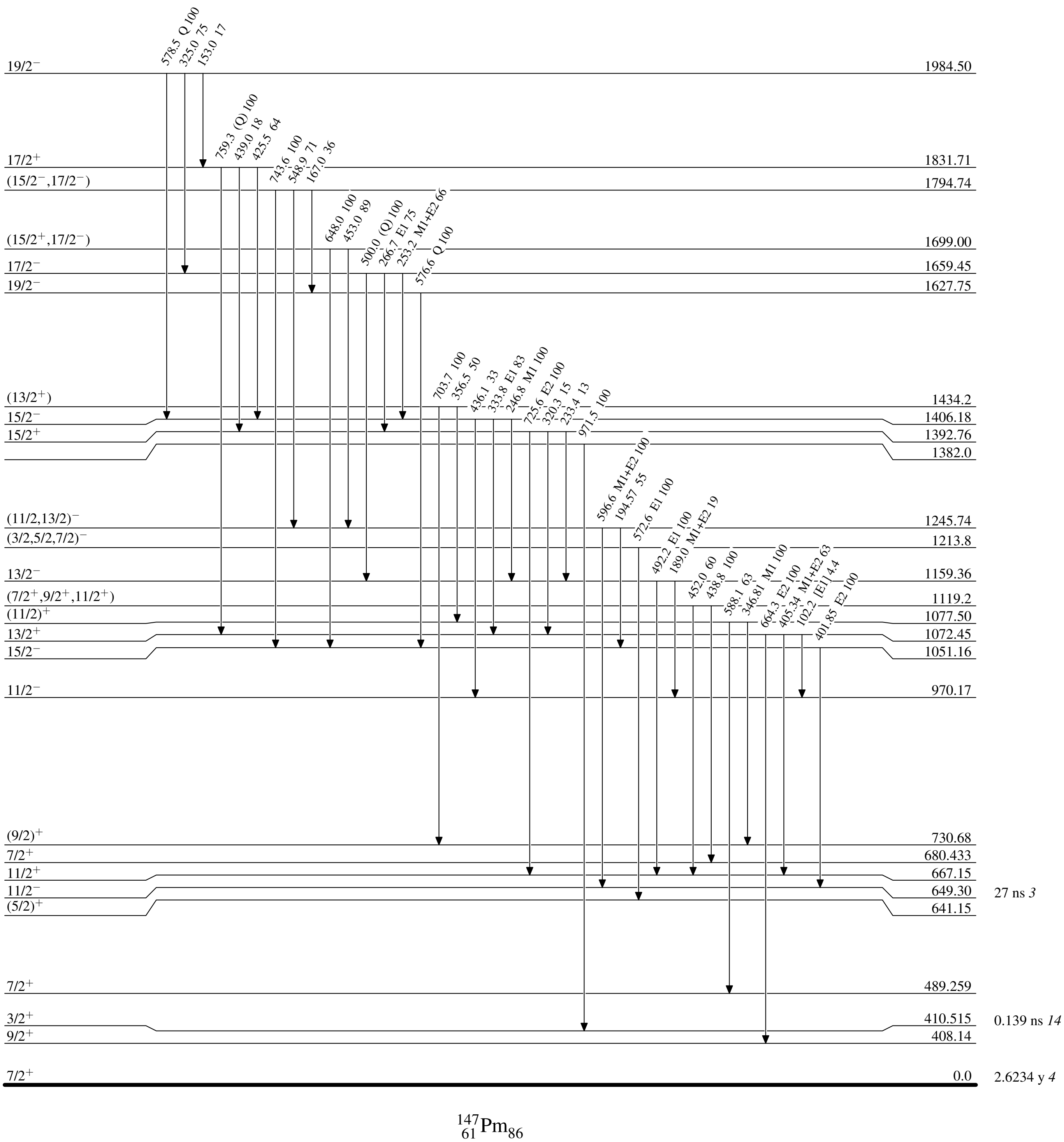


$^{147}_{61}Pm_{86}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



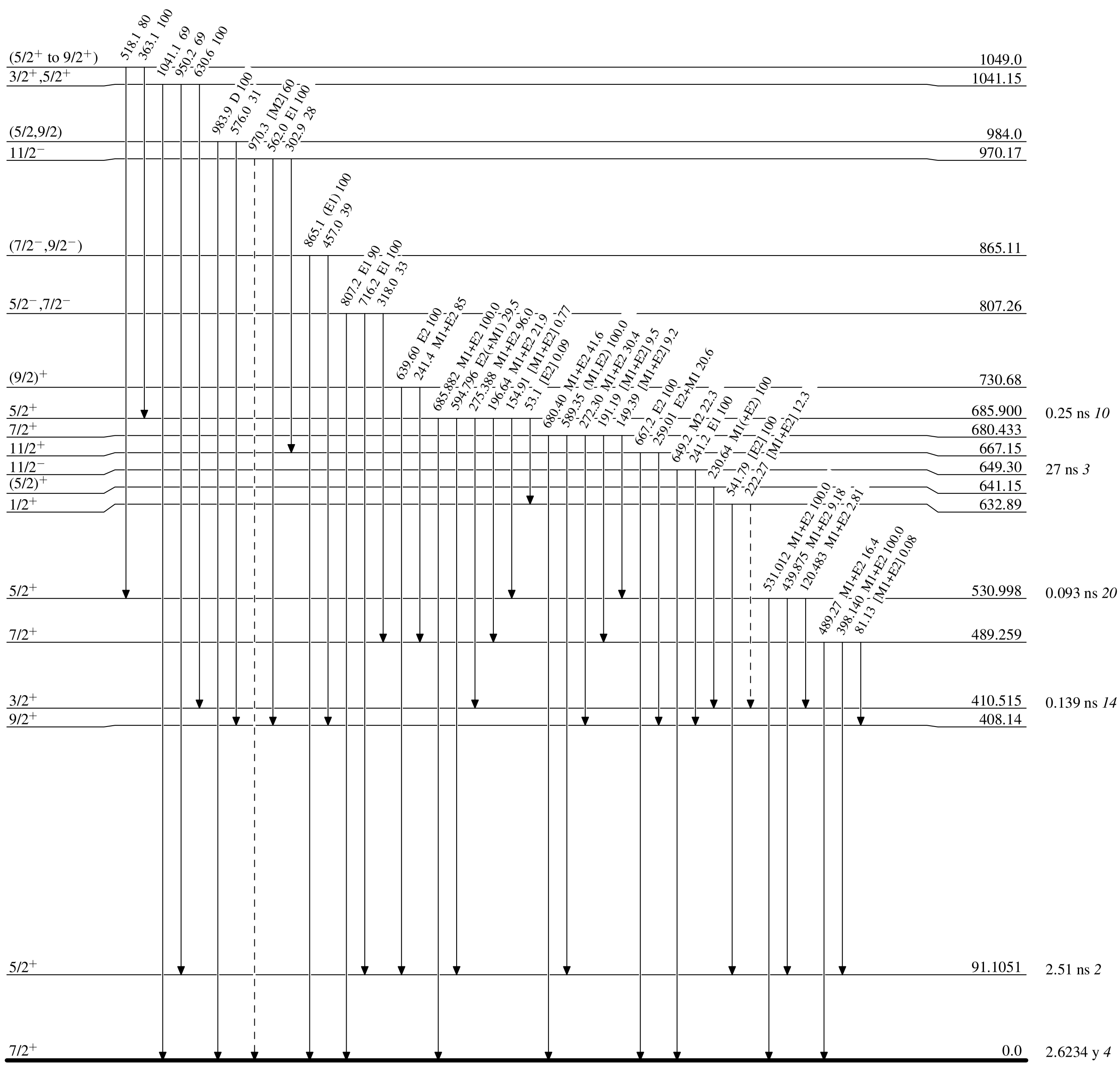
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

- - - - - - ► γ Decay (Uncertain)

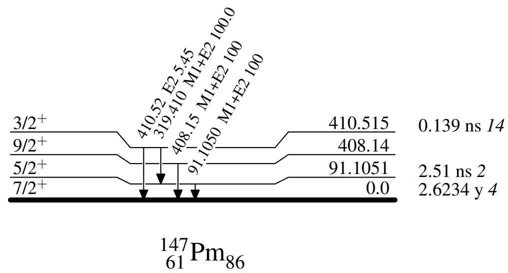


$^{147}_{61}Pm_{86}$

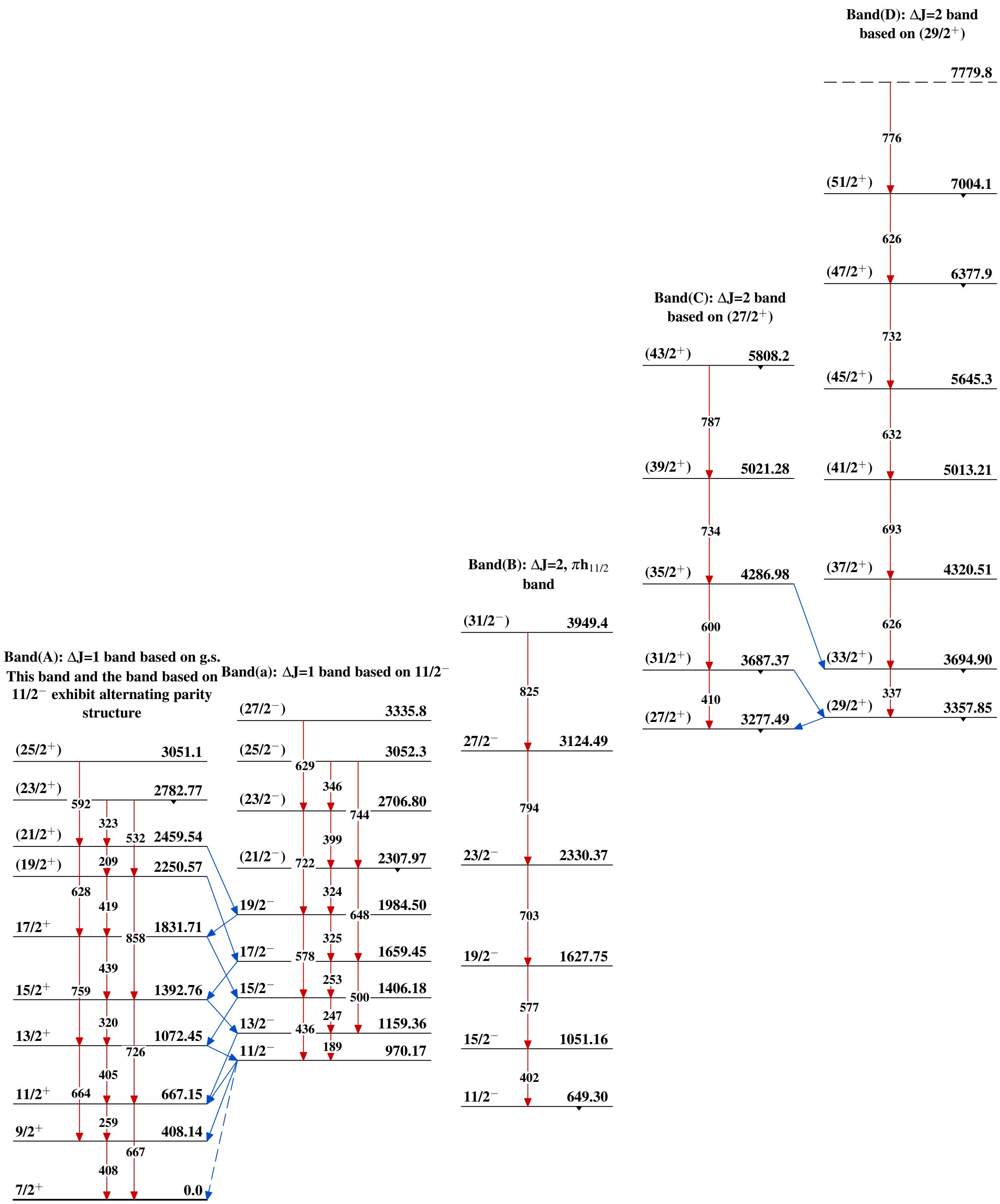
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

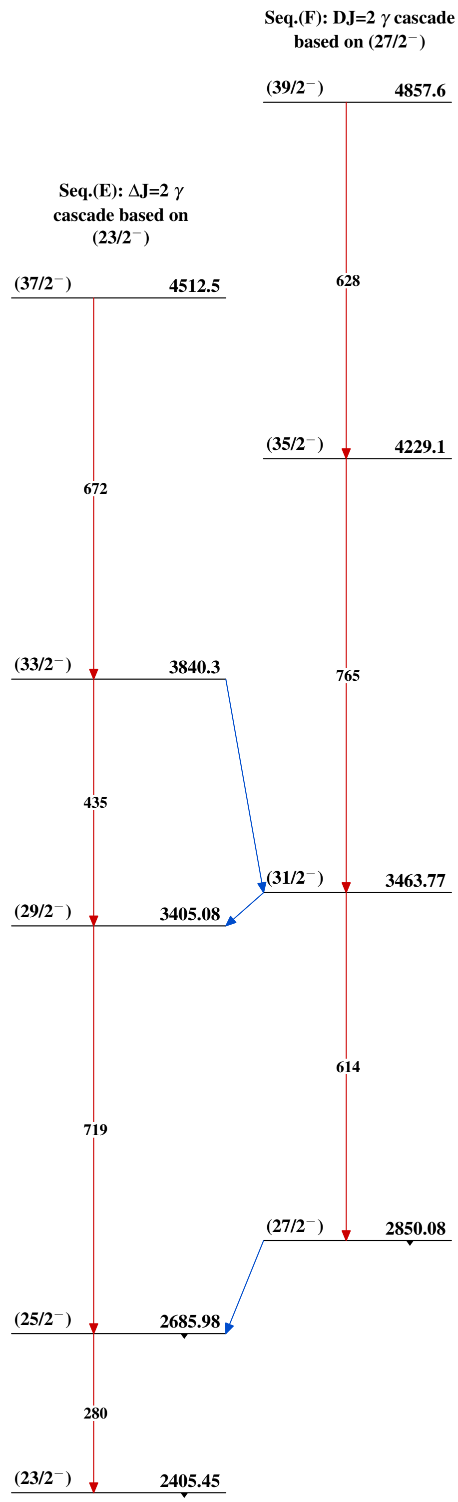


Adopted Levels, Gammas



$^{147}_{61}Pm_{86}$

Adopted Levels, Gammas (continued)



$^{147}_{61}Pm_{86}$