Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 108,2173 (2007)	1-Oct-2006

Q(β^-)=−3617 *15*; S(n)=9933 *14*; S(p)=3982 *9*; Q(α)=−1.3×10^2 *3* 2012Wa38
Note: Current evaluation has used the following Q record −3597 169921 153998 9 2003Au03.
Additional information 1.

^{137}Pr Levels

Cross Reference (XREF) Flags

A ^{137}Nd ε decay
B (HI,xnγ)

E(level)	J$^\pi$[†]	T$_{1/2}$	XREF	Comments
0.0[&]	5/2$^+$	1.28 h *3*	AB	%ε+%β^+=100 T$_{1/2}$: from 1967Va04 for 836γ(t). Authors also report T$_{1/2}$=1.249 h *3* from $\gamma^\pm$(t). 1973Bu17 report 1.37 h *5* from $\gamma^\pm$(t). Other: 1.5 h *1* (1958Da13). J$^\pi$: atomic beam (1976Fu06), log *ft*=5.4 for ε decay to 3/2$^+$ level; configuration=(π d$_{5/2}$) (1989Xu01).
75.5 *1*	3/2$^+$	0.38 ns *3*	A	T$_{1/2}$: from 1973Bu18 in ^{137}Nd ε decay. J$^\pi$: 75.5γ is M1, log *ft*=6.3 from 1/2$^+$ parent.
229.88 *16*	7/2$^+$		AB	J$^\pi$: see comment on 561.22 level.
313.6 *2*	(5/2$^+$)		A	J$^\pi$: γ's to 3/2$^+$ and 5/2$^+$ levels, no ε decay from 1/2$^+$ parent.
382.00 *15*	(3/2,1/2)$^+$	0.5 ns *2*	A	T$_{1/2}$: from 1973Bu18 in ^{137}Nd ε decay. J$^\pi$: M1,E2 γ's to 5/2$^+$ and 3/2$^+$ levels, log *ft*=6.7 for ε decay from 1/2$^+$ parent.
561.22[b] *23*	11/2$^-$	2.66 μs *7*	B	T$_{1/2}$: from 1987Dr12, 1992Dr04. Others: >2 μs (1989Xu01), 300 ns *100* (1975Kl02). J$^\pi$: (M2)−(M1+E2) cascade to 5/2$^+$, no ε from 1/2$^+$ to 229.88 level suggests J=11/2$^-$ and 7/2$^+$ for the 561.22 and 229.88 levels, respectively; configuration=(π h$_{11/2}$) (1989Xu01).
562.13[&] *16*	9/2$^+$		B	
580.6 *1*	3/2$^+$		A	J$^\pi$: E2,M1 γ rays to 7/2$^+$,5/2$^+$,3/2$^+$ levels, log *ft*=5.9 for ε decay from 1/2$^+$ parent.
724.7 *3*	(5/2)$^+$		A	J$^\pi$: γ ray to 3/2$^+$ is M1(+E2), no ε decay from 1/2$^+$ parent.
761.5 *2*	3/2$^+$		A	J$^\pi$: γ's to 7/2$^+$,5/2$^+$,3/2$^+$, log *ft*=6.1 for ε decay from 1/2$^+$ parent.
824.6? *3*	(11/2$^+$)		B	
857.0 *2*	(1/2)$^+$		A	J$^\pi$: log *ft*=6.0 from 1/2$^+$ parent, strong M1+(E2) γ ray to 3/2$^+$ and very weak γ ray to 5/2$^+$ level.
929.1 *2*	(3/2$^+$)		A	J$^\pi$: log *ft*=6.3 from 1/2$^+$ parent, 929γ to 5/2$^+$ is M1(+E2).
959.2 *5*			A	
1001.3 *5*	(1/2)$^+$		A	J$^\pi$: log *ft*=6.1 from 1/2$^+$ parent, strong M1+(E2) γ ray to 3/2$^+$, and very a weak γ ray to 5/2$^+$ level.
1078.41[b] *25*	15/2$^-$		B	
1188.9[d] *3*	13/2$^-$		B	
1247.7 *5*			A	
1293.6? *2*			A	
1310.0 *4*			A	
1348.91[&] *23*	13/2$^+$		B	
1484.6 *2*			A	
1625.1 *4*	1/2,3/2		A	J$^\pi$: log *ft*=6.2 from 1/2$^+$ parent.
1745.6 *4*	(15/2$^-$)		B	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{137}Pr Levels (continued)

E(level)	Jπ†	XREF	Comments
1836.8[d] 3	17/2⁻	B	
1871.4[b] 3	19/2⁻	B	
1940.8 3		A	
1968.9 3	(1/2⁺)	A	
1976.9 3	(1/2⁺)	A	Jπ: log *ft*=6.2 from 1/2⁺ parent, strong γ ray to 3/2⁺ and weak γ ray to 5/2⁺ level.
2008.6 2	(3/2)	A	Jπ: log *ft*=6.2 from 1/2⁺ parent, γ rays to 3/2⁺ and 5/2⁺ levels have comparable Iγ.
2044.6 3		A	
2126.6 3	(1/2⁺)	A	Jπ: log *ft*=5.9 from 1/2⁺ parent, strong γ ray to 3/2⁺ and weak γ ray to 5/2⁺ level.
2286.6 3	17/2⁺	B	
2306.98[&] 25	17/2⁺	B	
2365.0? 4		A	
2410? 1		A	
2434.8 3	19/2⁺	B	
2506.9 4		B	
2543.5? 5		A	
2590 1		A	
2622.7[e] 3	21/2⁻	B	Jπ: 1992Dr04 assign 23/2⁻.
2643.5[&] 3	21/2⁺	B	
2713.8[d] 3	21/2⁻	B	
2776.3[b] 3	23/2⁻	B	
2842.9 3	23/2⁺	B	
2920.5 4	23/2⁺	B	
3000.8 4	(21/2⁺)	B	
3031.2[‡] 3	25/2⁺	B	
3050.1 4		B	
3095.8 4	(25/2⁺)	B	
3177.3[#] 4	25/2⁺	B	
3308.4[e] 3	25/2⁻	B	
3363.3[a] 4	23/2⁺	B	Jπ: (25/2⁺) in 1992Dr04.
3439.7[c] 3	25/2⁻	B	Jπ: 27/2⁻ given by 1992Dr04 possibly based on mult (662γ)=Q.
3520.9[&] 3	25/2⁺	B	Jπ: (27/2⁻) in 1992Dr04.
3551.2[c] 4	27/2⁻	B	Jπ: 29/2⁻ in 1992Dr04.
3614.2[#] 5	27/2⁺	B	
3687.3[b] 4	27/2⁻	B	
3746.4 11	(27/2⁺)	B	
3791.9[‡] 4	29/2⁺	B	
3845.5 4		B	
3871.9[c] 4	29/2⁻	B	
3904.3[a] 4	27/2⁺	B	
3953.3[@] 4		B	
4102.6 5		B	
4118.0[&] 4	29/2⁺	B	
4213.2[c] 5	31/2⁻	B	
4221.9[e] 4	(29/2⁻)	B	Jπ: 33/2⁻ in 1992Dr04.
4304.1[#] 5		B	
4318.1[@] 5		B	
4579.5[a] 4	31/2⁺	B	
4622.4[b] 4	31/2⁻	B	
4696.5[c] 5	33/2⁻	B	
4700.1[@] 5		B	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{137}Pr Levels (continued)

E(level)	Jπ†	XREF	E(level)	Jπ†	XREF	E(level)	Jπ†	XREF
4735.4‡ *4*	33/2+	B	5470.5[a] *5*	(35/2+)	B	5923.6[c] *6*	39/2−	B
4813.4[e] *5*	33/2−	B	5471.2[e] *5*		B	6016.0[e] *6*		B
4969.7[e] *5*		B	5515.4[c] *6*	37/2−	B	6070.1& *11*	(37/2+)	B
5024.1& *5*	(33/2+)	B	5615?@		B	6388.7[c] *7*	(41/2−)	B
5131.3@ *6*		B	5624?‡	(37/2+)	B	6445.6[a] *5*	(39/2+)	B
5171.0# *5*		B	5657.5[b] *5*	(35/2−)	B	7434?[a]	(43/2+)	B
5174.7[c] *5*	35/2−	B	5719.0[e] *6*		B			

† Unless given otherwise, J^π are based upon $\gamma(\theta)$, excit, and band assignments. The higher-energy levels are divided into the following two categories: a group of levels that decay to the $11/2^-$ level, which are assumed to have negative parity, and those that feed the $9/2^+$ level are of positive parity (1992Dr04). J^π of some of the higher levels, as given in 1992Dr04, differ from those in 1989Xu01 mainly because $J^\pi(3440)=27/2^-$ in 1992Dr04 (based on mult(662γ)=Q, which seems unlikely), instead of $25/2^-$. Band assignments are from 1989Xu01, they suggest triaxial shape for the g.s. band.

‡ Band(A): band 1, π=+.

Band(B): band 2, π=+.

@ Band(C): band 3.

& Band(D): Band 4, (π,α)=(+,+1/2) triaxial shape (γ≈30°).

[a] Band(E): band 4a, (π,α)=(+,−1/2).

[b] Band(F): band 5, (π,α)=(-,−1/2).

[c] Band(G): Band 6, ΔJ=1 based on configuration=$((\pi\ h_{11/2})(\nu\ h_{11/2})^2)$. Collective oblate shape (γ=−60°). Magnetic Dipole Rotational Band (2000Am02).

[d] Band(H): band 6a. Possible unfavored $(\pi,H_{11/2})$.

[e] Band(I): band 7.

Adopted Levels, Gammas (continued)

$\gamma(^{137}Pr)$

All data are from ^{137}Nd ε decay where available, otherwise from (HI,xnγ). Most of the multipolarities given as Q (quadrupolar) are expected to be stretched E2.

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	δ	α[#]	Comments
75.5	3/2$^+$	75.5 *1*	100	0.0	5/2$^+$	M1+E2	0.115	2.95	α(K)=2.47 *4*; α(L)=0.371 *6*; α(M)=0.0789 *12*; α(N+..)=0.0205 *3* α(N)=0.0176 *3*; α(O)=0.00279 *4*; α(P)=0.000189 *3* B(M1)(W.u.)=0.034 *3*; B(E2)(W.u.)=48 *4*
229.88	7/2$^+$	230.5 *1*	100	0.0	5/2$^+$	M1,E2		0.122 *5*	α(K)=0.100 *9*; α(L)=0.018 *4*; α(M)=0.0039 *8*; α(N+..)=0.00100 *19* α(N)=0.00086 *17*; α(O)=0.000131 *21*; α(P)=7.0×10^{-6} *13* Mult.: from α(K)exp and K/L in ε decay.
313.6	(5/2$^+$)	238.2 *1*	100.0 *7*	75.5	3/2$^+$	M1,E2		0.111 *6*	α(K)=0.091 *9*; α(L)=0.016 *3*; α(M)=0.0035 *7*; α(N+..)=0.00089 *16* α(N)=0.00077 *14*; α(O)=0.000118 *17*; α(P)=6.3×10^{-6} *12*
		313.50 *15*	22 *4*	0.0	5/2$^+$	M1,E2		0.050 *6*	α(K)=0.042 *7*; α(L)=0.00665 *25*; α(M)=0.00142 *8*; α(N+..)=0.000367 *14* α(N)=0.000315 *14*; α(O)=4.91×10^{-5} *8*; α(P)=3.0×10^{-6} *7*
382.00	(3/2,1/2)$^+$	306.60 *15*	100.0 *5*	75.5	3/2$^+$	M1,E2		0.053 *6*	α(K)=0.044 *7*; α(L)=0.0071 *4*; α(M)=0.00152 *10*; α(N+..)=0.000394 *19* α(N)=0.000338 *18*; α(O)=5.26×10^{-5} *12*; α(P)=3.2×10^{-6} *7*
		382.00 *15*	10.3 *13*	0.0	5/2$^+$	M1,E2		0.029 *5*	α(K)=0.024 *5*; α(L)=0.00366 *17*; α(M)=0.00078 *3*; α(N+..)=0.000202 *10* α(N)=0.000173 *7*; α(O)=2.72×10^{-5} *19*; α(P)=1.7×10^{-6} *5*
561.22	11/2$^-$	331.3 *2*	100 *6*	229.88	7/2$^+$	M2		0.196	α(K)=0.1623 *23*; α(L)=0.0261 *4*; α(M)=0.00562 *8*; α(N+..)=0.001472 *21* α(N)=0.001257 *18*; α(O)=0.000201 *3*; α(P)=1.412×10^{-5} *20* B(M2)(W.u.)=0.079 *10*
		563.4 *2*	19 *13*	0.0	5/2$^+$				
562.13	9/2$^+$	332.1 *2*	<2.1	229.88	7/2$^+$				I_γ: Iγ(332.1)/Iγ(562.3γ)=6.8 *34*/100 *10* (1992Dr04).
		562.3 *2*	100.0 *10*	0.0	5/2$^+$	Q			
580.6	3/2$^+$	198.5 *1*	5.0 *5*	382.00	(3/2,1/2)$^+$	M1,E2		0.192 *4*	α(K)=0.154 *9*; α(L)=0.030 *9*; α(M)=0.0066 *19*; α(N+..)=0.0017 *5* α(N)=0.0014 *4*; α(O)=0.00022 *6*; α(P)=1.06×10^{-5} *18*
		267.0 *1*	7.5 *10*	313.6	(5/2$^+$)	M1,E2		0.079 *7*	α(K)=0.065 *8*; α(L)=0.0111 *13*; α(M)=0.0024 *3*; α(N+..)=0.00061 *7* α(N)=0.00053 *7*; α(O)=8.1×10^{-5} *7*; α(P)=4.6×10^{-6} *10*
		350.0 *5*	3 *1*	229.88	7/2$^+$				
		505.1 *3*	70 *10*	75.5	3/2$^+$	M1,E2		0.014 *3*	α(K)=0.0116 *25*; α(L)=0.00166 *21*; α(M)=0.00035 *4*; α(N+..)=9.1×10^{-5} *12* α(N)=7.8×10^{-5} *10*; α(O)=1.24×10^{-5} *18*; α(P)=8.5×10^{-7} *22*

$^{137}_{59}Pr_{78}$-4

Adopted Levels, Gammas (continued)

γ(^{137}Pr) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	α[#]	Comments
580.6	3/2$^+$	580.6 *1*	100.0 *10*	0.0	5/2$^+$	M1,E2	0.0096 *21*	α(K)=0.0082 *18*; α(L)=0.00114 *17*; α(M)=0.00024 *4*; α(N+..)=6.3×10^{-5} *10* α(N)=5.4×10^{-5} *8*; α(O)=8.6×10^{-6} *14*; α(P)=6.0×10^{-7} *15*
724.7	(5/2)$^+$	342.0 *5*		382.00	(3/2,1/2)$^+$			
		649.4 *3*		75.5	3/2$^+$	M1(+E2)	0.0073 *16*	α(K)=0.0062 *14*; α(L)=0.00085 *14*; α(M)=0.00018 *3*; α(N+..)=4.7×10^{-5} *8* α(N)=4.0×10^{-5} *7*; α(O)=6.4×10^{-6} *12*; α(P)=4.5×10^{-7} *12*
		724.8 *3*		0.0	5/2$^+$			
761.5	3/2$^+$	180.8 *5*	1.4 *3*	580.6	3/2$^+$			
		447.5 *5*	≤1.4	313.6	(5/2$^+$)			
		531.00 *15*	8.6 *14*	229.88	7/2$^+$	(E2)	0.00959	α(K)=0.00800 *12*; α(L)=0.001256 *18*; α(M)=0.000268 *4*; α(N+..)=6.91×10^{-5} *10* α(N)=5.93×10^{-5} *9*; α(O)=9.25×10^{-6} *13*; α(P)=5.59×10^{-7} *8*
		686.1 *1*	20 *3*	75.5	3/2$^+$	E2+(M1)	0.0064 *14*	α(K)=0.0054 *12*; α(L)=0.00074 *13*; α(M)=0.00016 *3*; α(N+..)=4.1×10^{-5} *7* α(N)=3.5×10^{-5} *6*; α(O)=5.6×10^{-6} *10*; α(P)=4.0×10^{-7} *10*
		761.6 *2*	100.0 *14*	0.0	5/2$^+$	M1,E2	0.0050 *11*	α(K)=0.0042 *10*; α(L)=0.00057 *10*; α(M)=0.000120 *21*; α(N+..)=3.1×10^{-5} *6* α(N)=2.7×10^{-5} *5*; α(O)=4.3×10^{-6} *8*; α(P)=3.1×10^{-7} *8*
824.6?	(11/2$^+$)	594.7 *2*	100	229.88	7/2$^+$			
857.0	(1/2)$^+$	276.3 *1*	6.9 *11*	580.6	3/2$^+$	M1+(E2)	0.072 *7*	α(K)=0.059 *8*; α(L)=0.0099 *10*; α(M)=0.00213 *24*; α(N+..)=0.00055 *6* α(N)=0.00047 *5*; α(O)=7.3×10^{-5} *5*; α(P)=4.2×10^{-6} *9*
		474.90 *15*	12.3 *21*	382.00	(3/2,1/2)$^+$	M1+(E2)	0.016 *4*	α(K)=0.014 *3*; α(L)=0.00197 *22*; α(M)=0.00042 *5*; α(N+..)=0.000108 *12* α(N)=9.3×10^{-5} *10*; α(O)=1.47×10^{-5} *19*; α(P)=9.9×10^{-7} *25*
		781.6 *1*	100.0 *11*	75.5	3/2$^+$	M1+(E2)	0.0047 *10*	α(K)=0.0040 *9*; α(L)=0.00054 *10*; α(M)=0.000113 *20*; α(N+..)=3.0×10^{-5} *6* α(N)=2.5×10^{-5} *5*; α(O)=4.0×10^{-6} *8*; α(P)=2.9×10^{-7} *7*
		857.0 *2*	≤2.5	0.0	5/2$^+$			
929.1	(3/2$^+$)	167.5 *5*	≤6.5	761.5	3/2$^+$			
		348.50 *25*	≤8.7	580.6	3/2$^+$	E2,(M1)	0.037 *6*	α(K)=0.031 *6*; α(L)=0.00481 *9*; α(M)=0.001025 *16*; α(N+..)=0.000265 *5* α(N)=0.000228 *4*; α(O)=3.57×10^{-5} *13*; α(P)=2.2×10^{-6} *6*
		546.90 *15*	13 *4*	382.00	(3/2,1/2)$^+$			
		615.6 *1*	35.2 *35*	313.6	(5/2$^+$)	M1,E2	0.0083 *18*	α(K)=0.0071 *16*; α(L)=0.00098 *16*; α(M)=0.00021 *4*; α(N+..)=5.4×10^{-5} *9* α(N)=4.6×10^{-5} *8*; α(O)=7.4×10^{-6} *13*; α(P)=5.2×10^{-7} *13*
		929.20 *15*	100.0 *13*	0.0	5/2$^+$	M1+(E2)	0.0031 *7*	α(K)=0.0027 *6*; α(L)=0.00035 *7*; α(M)=7.4×10^{-5} *13*; α(N+..)=1.9×10^{-5} *4* α(N)=1.7×10^{-5} *3*; α(O)=2.7×10^{-6} *5*; α(P)=2.0×10^{-7} *5*

$^{137}_{59}Pr_{78}$-5

Adopted Levels, Gammas (continued)

γ(^{137}Pr) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	α[#]	Comments
959.2		883.7 *2*		75.5	3/2$^+$			
		959.2 *5*		0.0	5/2$^+$			
1001.3	(1/2)$^+$	144.5 *5*	≤0.9	857.0	(1/2)$^+$			
		619.2 *1*	7.9 *9*	382.00	(3/2,1/2)$^+$	M1,E2	0.0082 *18*	α(K)=0.0070 *16*; α(L)=0.00096 *16*; α(M)=0.00020 *3*; α(N+..)=5.3×10^{-5} *9* α(N)=4.5×10^{-5} *7*; α(O)=7.2×10^{-6} *13*; α(P)=5.1×10^{-7} *13*
		688.0 *5*	≤1.8	313.6	(5/2$^+$)			
		925.90 *15*	100.0 *11*	75.5	3/2$^+$	M1+(E2)	0.0031 *7*	α(K)=0.0027 *6*; α(L)=0.00036 *7*; α(M)=7.5×10^{-5} *13*; α(N+..)=2.0×10^{-5} *4* α(N)=1.7×10^{-5} *3*; α(O)=2.7×10^{-6} *5*; α(P)=2.0×10^{-7} *5*
		1001.2 *5*	≤3.5	0.0	5/2$^+$			
1078.41	15/2$^-$	517.1 *2*	100	561.22	11/2$^-$	E2	0.01029	α(K)=0.00857 *12*; α(L)=0.001357 *19*; α(M)=0.000290 *4*; α(N+..)=7.47×10^{-5} *11* α(N)=6.42×10^{-5} *9*; α(O)=9.99×10^{-6} *14*; α(P)=5.98×10^{-7} *9*
1188.9	13/2$^-$	627.7 *2*	100	561.22	11/2$^-$	Q		
1247.7		288.5 *3*		959.2				
		667.2 *5*		580.6	3/2$^+$			
		1247.5 *5*		0.0	5/2$^+$			
1293.6?		1218.3[a] *3*	≤50	75.5	3/2$^+$			
		1293.6[a] *2*	100.0 *17*	0.0	5/2$^+$			
1310.0		1234.5 *2*	100.0 *15*	75.5	3/2$^+$			
		1310.0 *4*	88 *13*	0.0	5/2$^+$			
1348.91	13/2$^+$	786.8 *2*	100	562.13	9/2$^+$	Q		
1484.6		525.30 *15*	63 *10*	959.2				
		627.5 *5*	≤29	857.0	(1/2)$^+$			
		1102.8 *10*	48 *10*	382.00	(3/2,1/2)$^+$			
		1484.6 *2*	100.0 *17*	0.0	5/2$^+$			
1625.1	1/2,3/2	623.8 *5*	21.8 *46*	1001.3	(1/2)$^+$			
		863.4 *4*	≤23.6	761.5	3/2$^+$			
		1044.50 *15*	68.2 *73*	580.6	3/2$^+$			
		1243.1 *2*	100.0 *9*	382.00	(3/2,1/2)$^+$			
1745.6	(15/2$^-$)	556.7 *2*	100	1188.9	13/2$^-$			
1836.8	17/2$^-$	648.0 *2*	19.7 *7*	1188.9	13/2$^-$			
		758.5 *2*	100 *4*	1078.41	15/2$^-$	D		
1871.4	19/2$^-$	793.2 *2*	100	1078.41	15/2$^-$	E2	0.00355	α(K)=0.00301 *5*; α(L)=0.000427 *6*; α(M)=9.01×10^{-5} *13*; α(N+..)=2.35×10^{-5} *4* α(N)=2.01×10^{-5} *3*; α(O)=3.18×10^{-6} *5*; α(P)=2.15×10^{-7} *3*
1940.8		1179.8 *5*	≤20	761.5	3/2$^+$			
		1360.0 *2*	100 *20*	580.6	3/2$^+$			
		1865.3 *2*	56 *10*	75.5	3/2$^+$			

$^{137}_{59}Pr_{78}$-6

Adopted Levels, Gammas (continued)

$\gamma(^{137}Pr)$ (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.
1940.8		1940.8 *5*	≤4	0.0	$5/2^+$	
1968.9	$(1/2^+)$	1388.5 *2*	≤100	580.6	$3/2^+$	
		1586.5 *2*	100 *20*	382.00	$(3/2,1/2)^+$	
		1969.0[@] *2*	100 *20*	0.0	$5/2^+$	
1976.9	$(1/2^+)$	1119.9 *2*	75 *17*	857.0	$(1/2)^+$	
		1594.5 *2*	58.3 *83*	382.00	$(3/2,1/2)^+$	
		1901.5 *1*	100 *8*	75.5	$3/2^+$	
		1977.3 *5*	≤11.7	0.0	$5/2^+$	
2008.6	(3/2)	1427.7 *3*	≤7.1	580.6	$3/2^+$	
		1626.4 *2*	100 *7*	382.00	$(3/2,1/2)^+$	
		1933.5[a] *3*	42.9 *71*	75.5	$3/2^+$	
		2008.6 *2*	35.7 *71*	0.0	$5/2^+$	
2044.6		1464.1 *1*	100 *17*	580.6	$3/2^+$	
		1662.5 *3*	≤17.2	382.00	$(3/2,1/2)^+$	
		1731.1 *3*	≤34.5	313.6	$(5/2^+)$	
		1969.0[@] *2*	43.1 *9*	75.5	$3/2^+$	
2126.6	$(1/2^+)$	1365.1 *2*	≤26.7	761.5	$3/2^+$	
		1401.50 *15*	33.3 *67*	724.7	$(5/2)^+$	
		1546.0 *2*	40 *8*	580.6	$3/2^+$	
		1744.6 *5*	≤6.7	382.00	$(3/2,1/2)^+$	
		1813.1 *2*	87 *11*	313.6	$(5/2^+)$	
		2051.3 *2*	100 *7*	75.5	$3/2^+$	
		2126.5 *3*	≤17.3	0.0	$5/2^+$	
2286.6	$17/2^+$	937.6 *2*	100.0 *17*	1348.91	$13/2^+$	Q
		1208[a] *1*	≤6.601	1078.41	$15/2^-$	
2306.98	$17/2^+$	958.2 *2*	100.0 *17*	1348.91	$13/2^+$	Q
		1228.2 *2*	21.1 *9*	1078.41	$15/2^-$	D
2365.0?		2288.7[a] *3*		75.5	$3/2^+$	
		2365.6[a] *5*		0.0	$5/2^+$	
2410?		785.3[a] *3*		1625.1	1/2,3/2	
		2095.7[a] *5*		313.6	$(5/2^+)$	
		2333.3[a] *10*		75.5	$3/2^+$	
2434.8	$19/2^+$	127.6 *2*	100.0 *20*	2306.98	$17/2^+$	D
		148.1 *2*	50.8 *14*	2286.6	$17/2^+$	D
2506.9		761.3 *2*	100	1745.6	$(15/2^-)$	Q
2543.5?		2230.6[a] *5*		313.6	$(5/2^+)$	
		2543.5[a] *5*		0.0	$5/2^+$	
2590		1296.5[a] *5*		1293.6?		
		2275.7 *10*		313.6	$(5/2^+)$	
		2515.3 *5*		75.5	$3/2^+$	

$^{137}_{59}Pr_{78}$-7

Adopted Levels, Gammas (continued)

$\gamma(^{137}Pr)$ (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.
2590		2590.5 *10*		0.0	$5/2^+$	
2622.7	$21/2^-$	751.0 *2*	100 *7*	1871.4	$19/2^-$	D
		786.0 *2*	84 *4*	1836.8	$17/2^-$	
2643.5	$21/2^+$	208.3 *2*	100	2434.8	$19/2^+$	D
2713.8	$21/2^-$	842.2 *2*	100 *4*	1871.4	$19/2^-$	D
		877.0 *2*	20.2 *5*	1836.8	$17/2^-$	
2776.3	$23/2^-$	905.4 *2*	100	1871.4	$19/2^-$	Q
2842.9	$23/2^+$	198.3 *2*	100	2643.5	$21/2^+$	D
2920.5	$23/2^+$	277.8 *2*	100	2643.5	$21/2^+$	D
3000.8	$(21/2^+)$	1164.0 *2*	100	1836.8	$17/2^-$	
3031.2	$25/2^+$	186.2 *2*	100	2842.9	$23/2^+$	D
3050.1		1178.7 *2*	100	1871.4	$19/2^-$	
3095.8	$(25/2^+)$	252.7 *2*	100	2842.9	$23/2^+$	D
3177.3	$25/2^+$	334.4 *2*	100	2842.9	$23/2^+$	D
3308.4	$25/2^-$	685.5 *2*	100	2622.7	$21/2^-$	Q
3363.3	$23/2^+$	442.9 *2*	100	2920.5	$23/2^+$	D
3439.7	$25/2^-$	131.1 *2*	34.1 *8*	3308.4	$25/2^-$	D
		598.0 *2*	100.0 *16*	2842.9	$23/2^+$	
		662.5 *2*	72.8 *20*	2776.3	$23/2^-$	D[†]
		725.8 *2*	85 *3*	2713.8	$21/2^-$	Q
3520.9	$25/2^+$	157.2 *2*	100 *4*	3363.3	$23/2^+$	D
		487.5 *2*	33.3 *9*	3031.2	$25/2^+$	
		601.1 *2*		2920.5	$23/2^+$	
		745.9 *2*	90 *3*	2776.3	$23/2^-$	
3551.2	$27/2^-$	111.5 *2*	100.0 *24*	3439.7	$25/2^-$	D
		774.9 *2*	40.9 *20*	2776.3	$23/2^-$	Q
3614.2	$27/2^+$	436.9 *2*	100	3177.3	$25/2^+$	D
3687.3	$27/2^-$	911.0 *2*	100	2776.3	$23/2^-$	
3746.4	$(27/2^+)$	383.1	100	3363.3	$23/2^+$	
3791.9	$29/2^+$	695.9 *2*	73.0 *15*	3095.8	$(25/2^+)$	
		760.8 *2*	100.0 *22*	3031.2	$25/2^+$	Q
3845.5		1069.2 *2*	100	2776.3	$23/2^-$	
3871.9	$29/2^-$	320.7 *2*	100	3551.2	$27/2^-$	D
3904.3	$27/2^+$	383.1 *2*	≤45	3520.9	$25/2^+$	
		541.3 *2*	100 *5*	3363.3	$23/2^+$	
3953.3		589.9 *2*	100	3363.3	$23/2^+$	
4102.6		230.7 *2*	100	3871.9	$29/2^-$	
4118.0	$29/2^+$	214[a]		3904.3	$27/2^+$	
		597.1 *2*	100	3520.9	$25/2^+$	Q
4213.2	$31/2^-$	341.3 *2*	100	3871.9	$29/2^-$	D
4221.9	$(29/2^-)$	913.5 *2*	100	3308.4	$25/2^-$	
4304.1		689.9 *2*	100	3614.2	$27/2^+$	
4318.1		364.8 *2*	100	3953.3		D
4579.5	$31/2^+$	461		4118.0	$29/2^+$	
		675.2 *2*		3904.3	$27/2^+$	Q
4622.4	$31/2^-$	935.1 *2*	100	3687.3	$27/2^-$	
4696.5	$33/2^-$	483.3 *2*	100	4213.2	$31/2^-$	D[‡]
4700.1		382.0 *2*	100	4318.1		D
4735.4	$33/2^+$	943.5 *2*	100	3791.9	$29/2^+$	Q
4813.4	$33/2^-$	941.5 *2*	100	3871.9	$29/2^-$	Q
4969.7		156.3 *2*	100	4813.4	$33/2^-$	
5024.1	$(33/2^+)$	906.1 *2*	100	4118.0	$29/2^+$	
5131.3		431.2 *2*	100	4700.1		
5171.0		866.9 *2*	100	4304.1		
5174.7	$35/2^-$	205.3 *2*	47 *15*	4969.7		
		478.2 *2*	100 *3*	4696.5	$33/2^-$	D
5470.5	$(35/2^+)$	891.0 *2*	100	4579.5	$31/2^+$	
5471.2		501.5 *2*	100	4969.7		
5515.4	$37/2^-$	340.7[&] *2*	100[&]	5174.7	$35/2^-$	
5615?		484.1[a] *2*	100	5131.3		
5624?	$(37/2^+)$	891.9[a] *2*	100	4735.4	$33/2^+$	
5657.5	$(35/2^-)$	1035.1 *2*	100	4622.4	$31/2^-$	
5719.0		247.8 *2*	100	5471.2		
5923.6	$39/2^-$	408.2 *2*	100	5515.4	$37/2^-$	D
6016.0		297.0 *2*	100	5719.0		
6070.1	$(37/2^+)$	1046 *1*	100	5024.1	$(33/2^+)$	
6388.7	$(41/2^-)$	465.1 *2*	100	5923.6	$39/2^-$	
6445.6	$(39/2^+)$	975.1 *2*	100	5470.5	$(35/2^+)$	
7434?	$(43/2^+)$	988.1[a] *2*	100	6445.6	$(39/2^+)$	

[†] $\gamma(\theta)$: A_2=−0.33 *3* (1989Xu01). Disagrees with A_2=+0.33 *5* (1992Dr04) giving mult=Q.

[‡] $\gamma(\theta)$:A_2=+0.19 *2* (1992Dr04), −0.42 *4* (1989Xu01).

[#] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned

$^{137}_{59}Pr_{78}$-8

Adopted Levels, Gammas (continued)

$\gamma(^{137}Pr)$ (continued)

multipolarities, and mixing ratios, unless otherwise specified.
[@] Multiply placed.
[&] Multiply placed with undivided intensity.
[a] Placement of transition in the level scheme is uncertain.

$^{137}_{59}Pr_{78}$-9

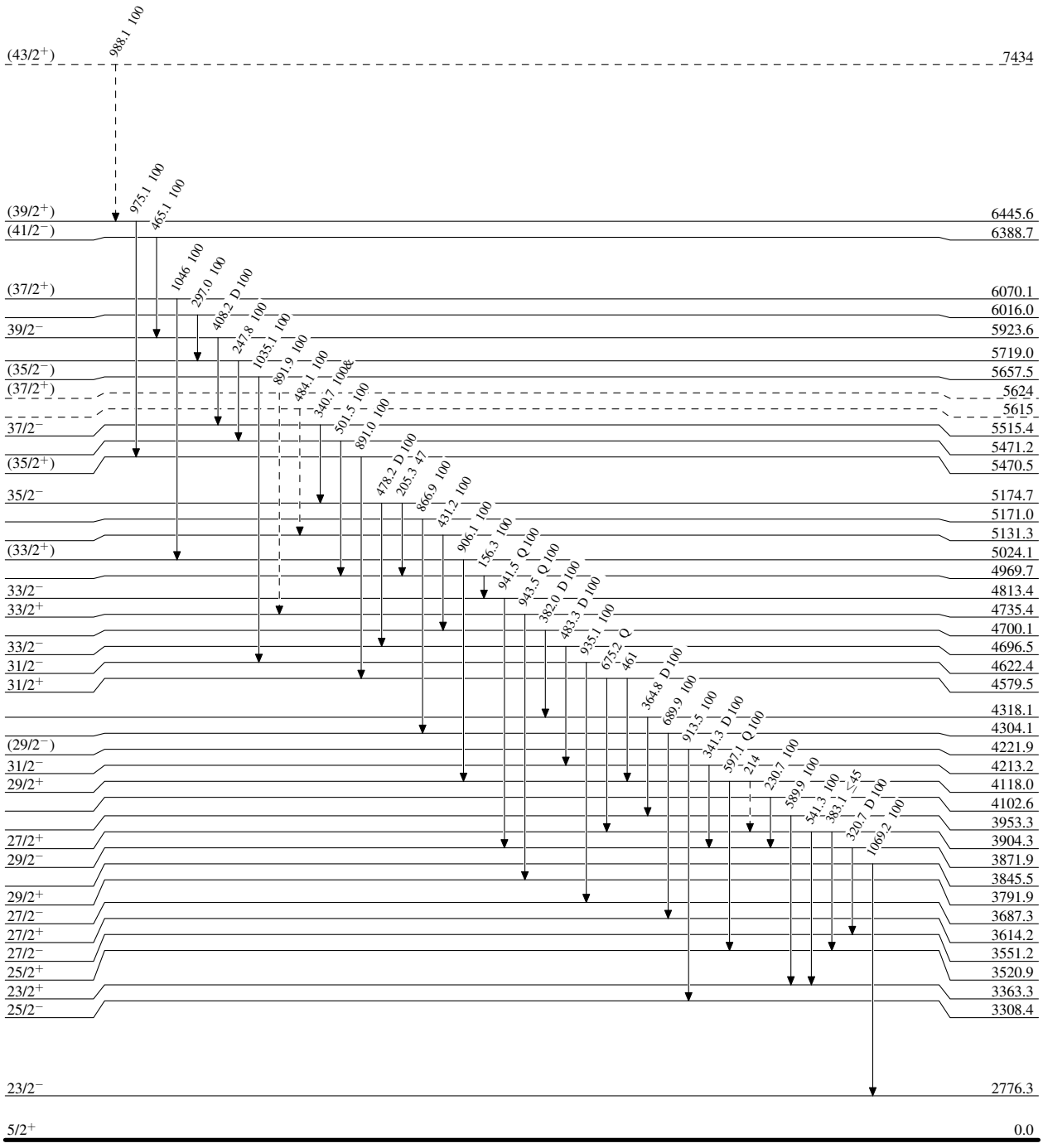
Adopted Levels, Gammas

Legend

Level Scheme

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

γ Decay (Uncertain)



$^{137}_{59}Pr_{78}$

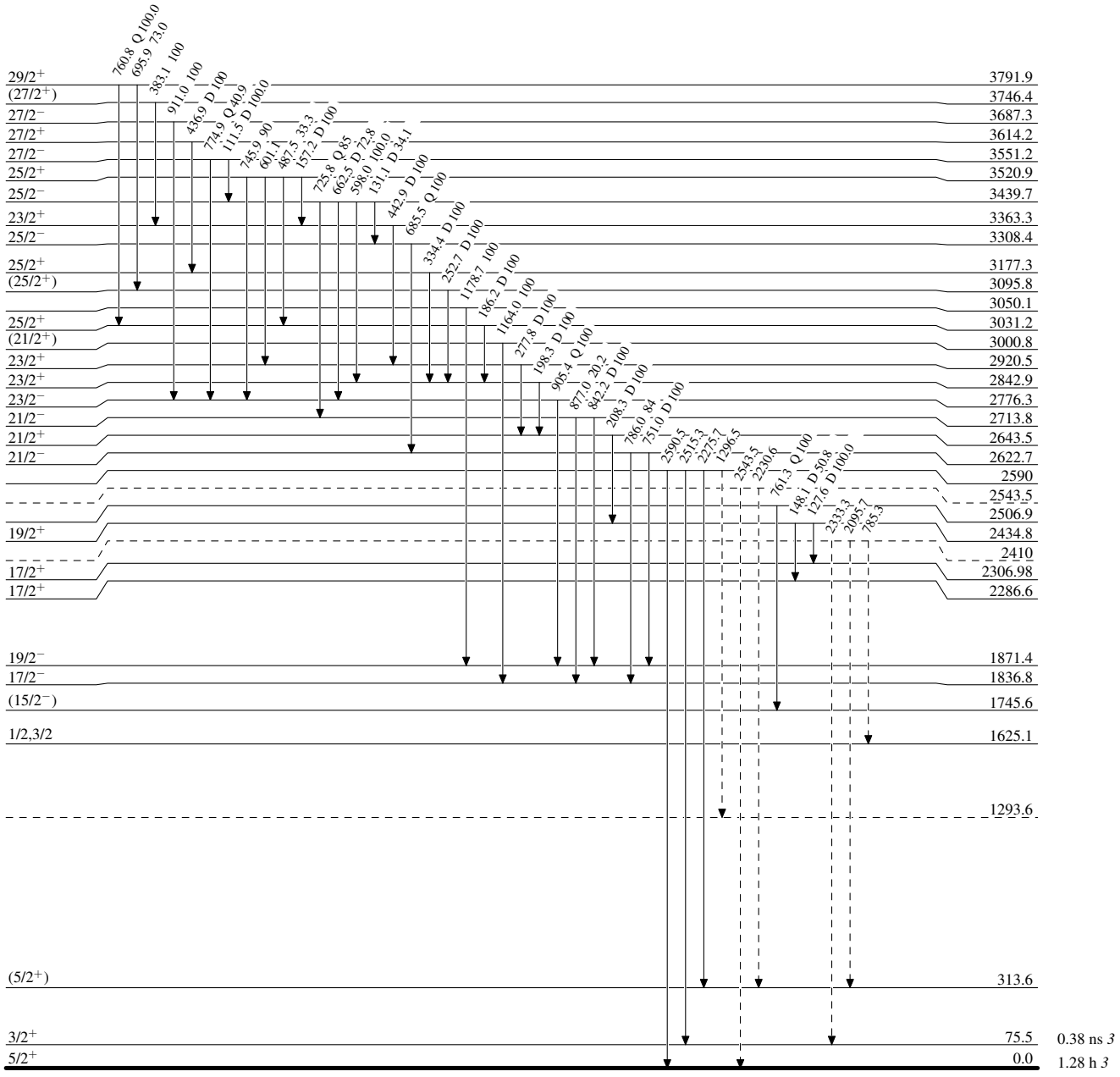
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

- - - - - - ► γ Decay (Uncertain)



$^{137}_{59}Pr_{78}$

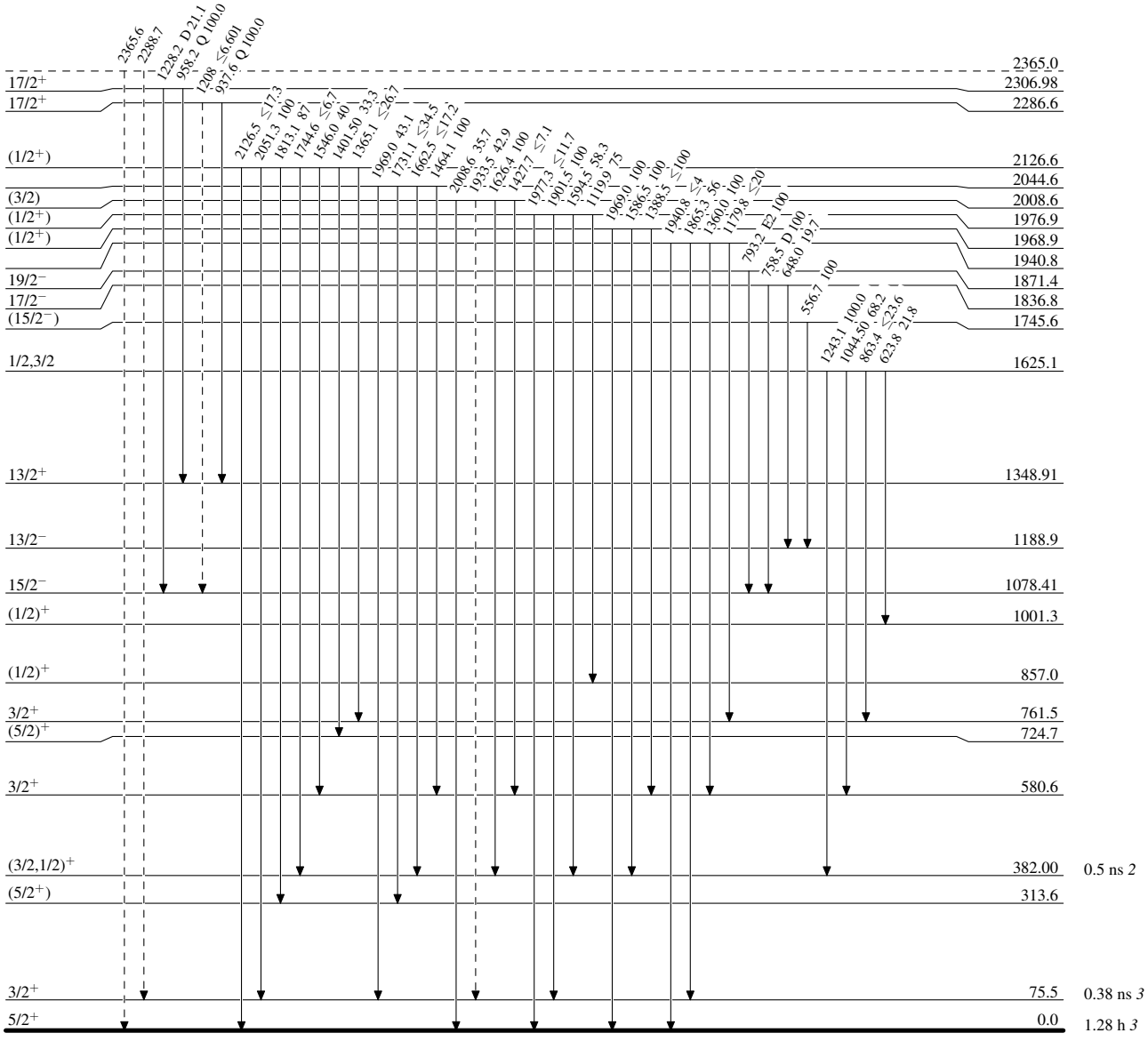
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

γ Decay (Uncertain)



$^{137}_{59}Pr_{78}$

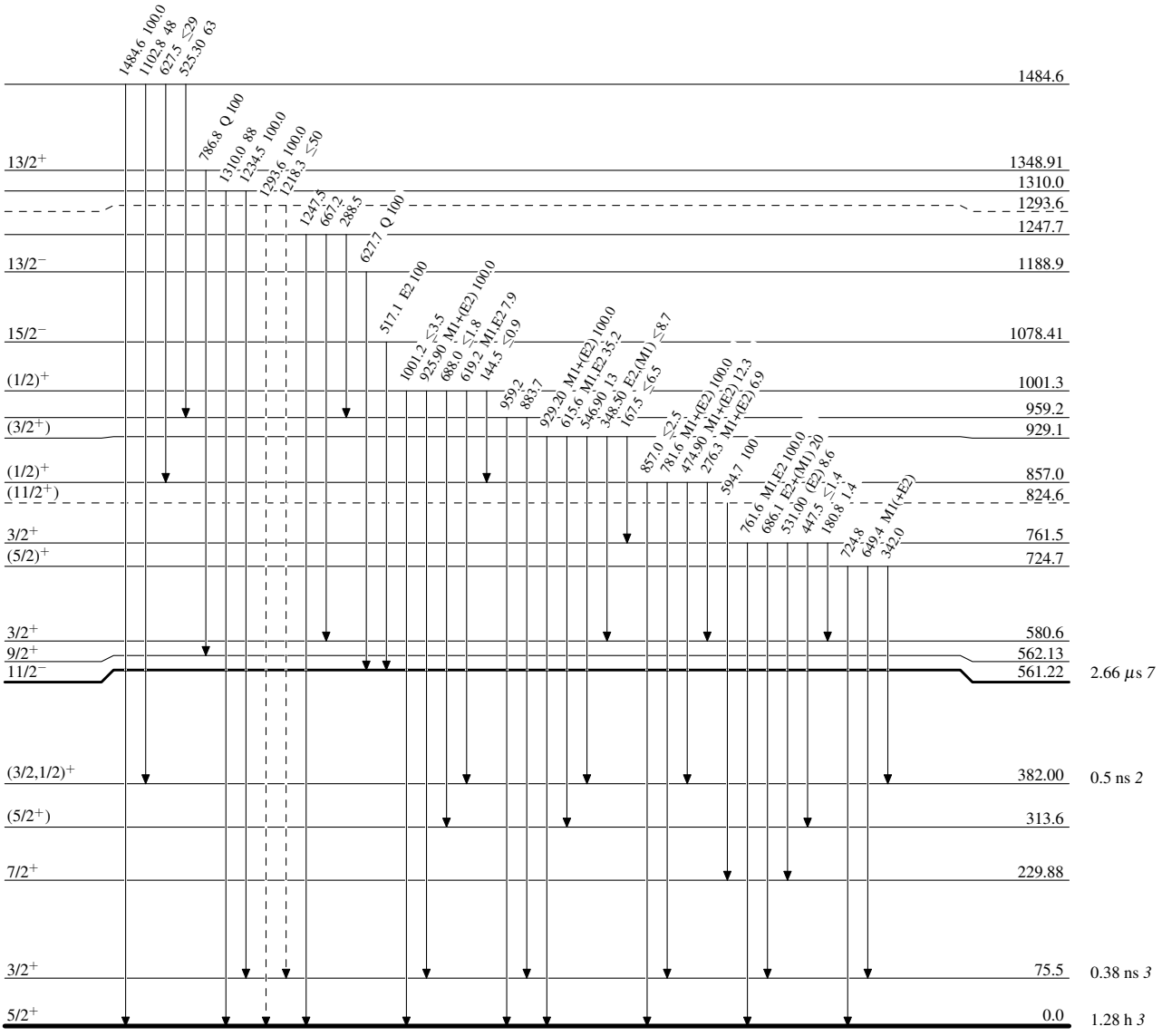
Adopted Levels, Gammas

Legend

Level Scheme (continued)

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

γ Decay (Uncertain)

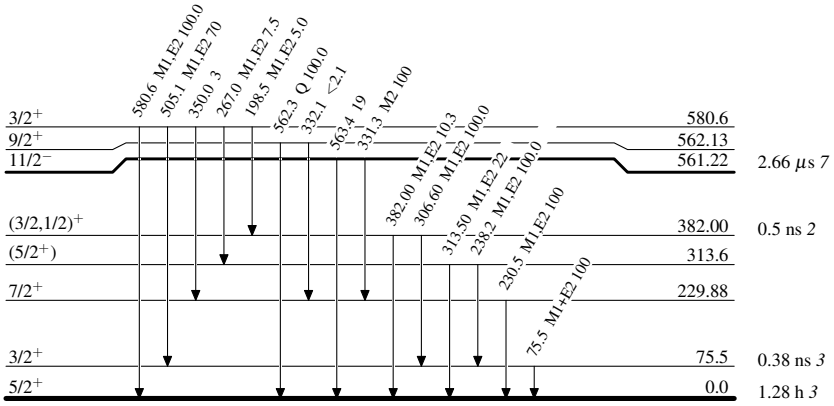


$^{137}_{59}Pr_{78}$

Adopted Levels, Gammas

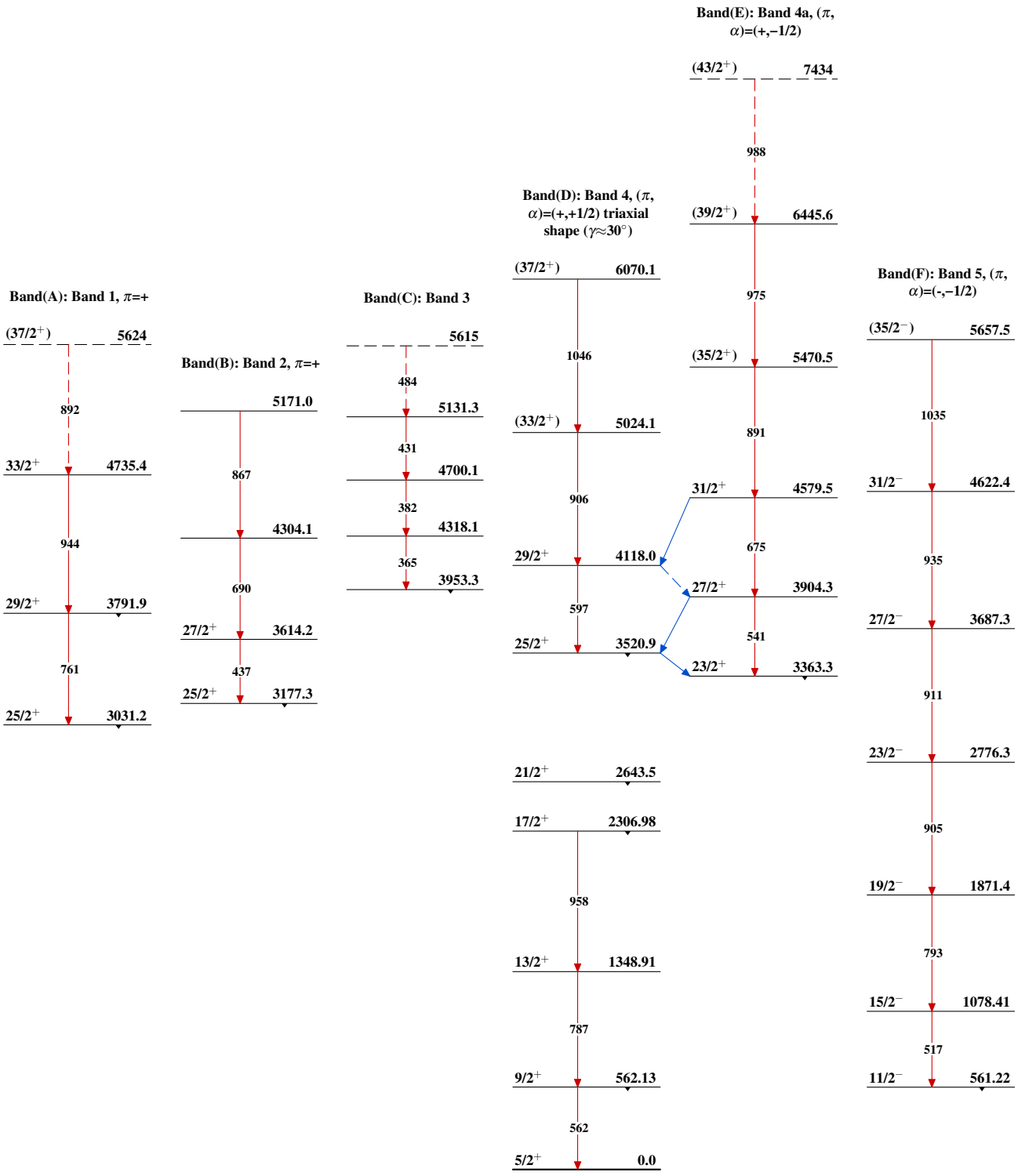
Level Scheme (continued)

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



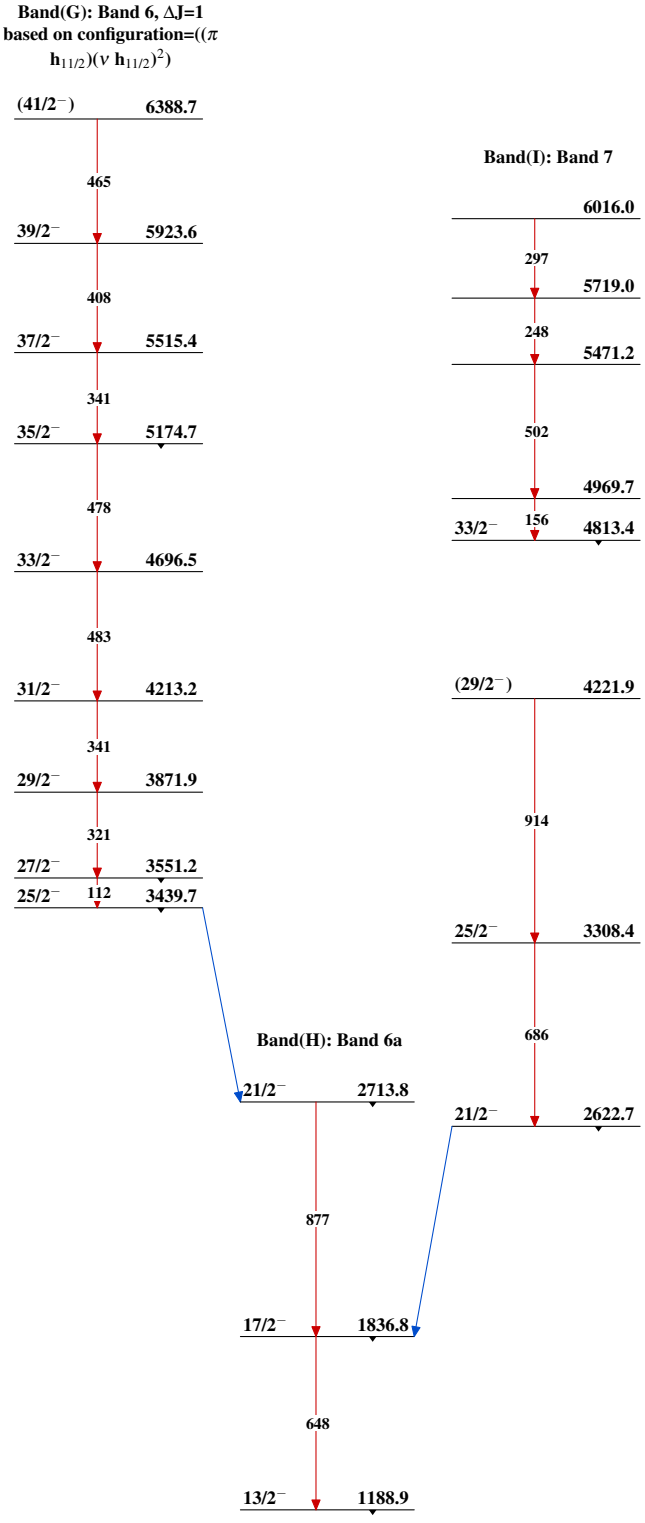
$^{137}_{59}Pr_{78}$

Adopted Levels, Gammas



$^{137}_{59}Pr_{78}$

Adopted Levels, Gammas (continued)



$^{137}_{59}Pr_{78}$