Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. J. Martin	NDS 114, 1497 (2013)	31-Aug-2013

Q(β^-)=6.39×10^3 *3*; S(n)=5050 *22*; S(p)=9.82×10^3 *3*; Q(α)=−3.47×10^3 *3* 2017Wa10
S(2n)=11600 *22*; S(2p)=2.22×10^4 *3* 2017Wa10
Additional information 1.

^{152}Pr Levels

Cross Reference (XREF) Flags

A ^{152}Ce β^- decay
B ^{252}Cf SF decay

E(level)	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	(4$^+$)#	3.57 s *18*	A	%β^-=100 T$_{1/2}$: Weighted average of 3.7 s *2* (1990An31), 3.8 s *2* (1985Br08, also reported in 1988Ka14), and 3.24 s *19* (1983Hi05).
114.8 *2*	(3$^+$)#	4.1 μs *1*	A	T$_{1/2}$: From (β)(114.8γ)(t). Other: 1.0 μs *3* (1990TaO7), also from $\beta\gamma$(t).
212.5 *2*	(1$^+$)#		A	T$_{1/2}$: (β)(97.7γ)(t) indicates a prompt coincidence.
296.7 *5*			A	
329.7 *5*			A	
658.8 *3*			A	
717.4 *4*			A	
751.7 *3*			A	
773.8 *3*			A	
786.2 *4*			A	
812.8 *3*			A	
844.1 *3*			A	
939.7 *2*			A	
975.4 *5*			A	
1414.8 *3*			A	
0+x†			B	
60.00+x‡ *3*			B	
136.00+x† *3*			B	
228.0+x‡ *3*			B	
336.4+x† *4*			B	
460.0+x‡ *5*			B	
600.9+x† *5*			B	
755.3+x‡ *6*			B	
928.2+x† *6*			B	
1108.7+x‡ *6*			B	
1314.3+x† *7*			B	
1514.1+x‡ *7*			B	
1754.4+x† *7*			B	
1966.5+x‡ *8*			B	
2243.1+x† *8*			B	
2462.7+x‡ *8*			B	
2777.1+x† *9*			B	
3002.2+x‡ *9*			B	

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Adopted Levels, Gammas (continued)

^{152}Pr Levels (continued)

† Band(A): Band A.
‡ Band(B): Band B.
# From $\Delta\pi$=no for the 98 and 115γ's, π must be the same for the g.s., 115, and 212 levels. For the g.s., the probable Nilsson states suggest configurations $\pi 3/2[541]\otimes\nu 3/2[521]$ or $\pi 3/2[541]\otimes\nu 5/2[642]$ (2011Li41) giving $K^\pi=3^+$ and 4^-, respectively. For J(g.s.)=4, mult(115γ) gives J^π(115 level)≥3 so there will be no direct β^- feeding. from the β^- decay scheme of 1995Ya21 one can deduce a β^- feeding to the 212 level of≈45% and thus a log *ft* of 4.6. since the decay scheme is incomplete, this feeding is likely an overestimate, but even if it were a factor of 10 smaller, the log *ft* would still be consistent only with J^π(212 level)=1^+. Then, from the mults As given above, it follows that J^π(115 level)=3^+ and π=+ for the g.s. for J(g.s.)=^{3,}Noavailable Nilsson configuration would give 3^-. for J^π(g.s.)=3^+, the above restriction on mult(115γ) is removed allowing E2 and thus allowing J^π(115)=1^+ and the possibility of a direct β^- branch to this level. In this case, the combined feeding to the 115 and 212 levels is still large, giving a low log *ft* and thus requiring $J^\pi=1^+$ for one or both of the 115 and 212 levels. 2011Li41 suggest that for the $K^\pi=3^+$ configuration, the J=4 member is expected to lie below the J=3 member. From all the above arguments, the most probable J^π assignment for the g.s. is 4^+, with configuration $\pi 3/2[541]\otimes\nu 3/2[521]$. One then has probable $J^\pi=3^+$ and 1^+ for the 115 and 212 levels, respectively, and an M1 component for the 98γ is ruled out.

$\gamma(^{152}Pr)$

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	α‡	Comments
114.8	(3^+)	114.8 *2*	100.0 *18*	0.0	(4^+)	M1(+E2)†	1.08 *22*	B(M1)(W.u.)≤1.90×10^{-6} *5*; B(E2)(W.u.)<0.062
212.5	(1^+)	97.7 *2*	62.2 *11*	114.8	(3^+)	E2†	2.30	
296.7		84.2 *4*	100	212.5	(1^+)			
329.7		117.2 *4*	100	212.5	(1^+)			
658.8		446.9 *3*	28 *7*	212.5	(1^+)			
		658.2 *4*	100 *19*	0.0	(4^+)			
717.4		421.7 *3*	100 *14*	296.7				
		503.9 *4*	40 *21*	212.5	(1^+)			
751.7		454.7 *4*	41 *11*	296.7				
		539.5 *4*	51 *17*	212.5	(1^+)			
		751.6 *4*	100 *31*	0.0	(4^+)			
773.8		443.9 *3*	18 *5*	329.7				
		561.6 *3*	16 *10*	212.5	(1^+)			
		773.8 *3*	100 *22*	0.0	(4^+)			
786.2		456.4 *3*	100 *16*	329.7				
		573.8 *3*	69 *7*	212.5	(1^+)			
812.8		812.8 *3*	100	0.0	(4^+)			
844.1		70.3 *3*	92 *5*	773.8				
		844.0 *3*	100 *23*	0.0	(4^+)			
939.7		727.2 *1*	100	212.5	(1^+)			
975.4		316.6 *4*	100	658.8				
1414.8		439.5 *3*	12.0 *19*	975.4				
		570.3 *4*	100 *6*	844.1				
		602.2 *4*	7.2 *21*	812.8				
60.00+x		60.0 *3*		0+x				
136.00+x		76.0 *3*		60.00+x				
		136.0 *3*		0+x				
228.0+x		92.0 *3*		136.00+x				
		168.0 *3*		60.00+x				
336.4+x		108.4 *3*		228.0+x				
		200.4 *3*		136.00+x				
460.0+x		232.0 *3*		228.0+x				
600.9+x		264.5 *3*		336.4+x				
755.3+x		295.3 *3*		460.0+x				
928.2+x		327.3 *3*		600.9+x				

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Adopted Levels, Gammas (continued)

$\gamma(^{152}Pr)$ (continued)

E_i(level)	E_γ	E_f	E_i(level)	E_γ	E_f	E_i(level)	E_γ	E_f
1108.7+x	353.4 *3*	755.3+x	1754.4+x	440.1 *3*	1314.3+x	2462.7+x	496.2 *3*	1966.5+x
1314.3+x	386.1 *3*	928.2+x	1966.5+x	452.4 *3*	1514.1+x	2777.1+x	534.0 *3*	2243.1+x
1514.1+x	405.4 *3*	1108.7+x	2243.1+x	488.7 *3*	1754.4+x	3002.2+x	539.5 *3*	2462.7+x

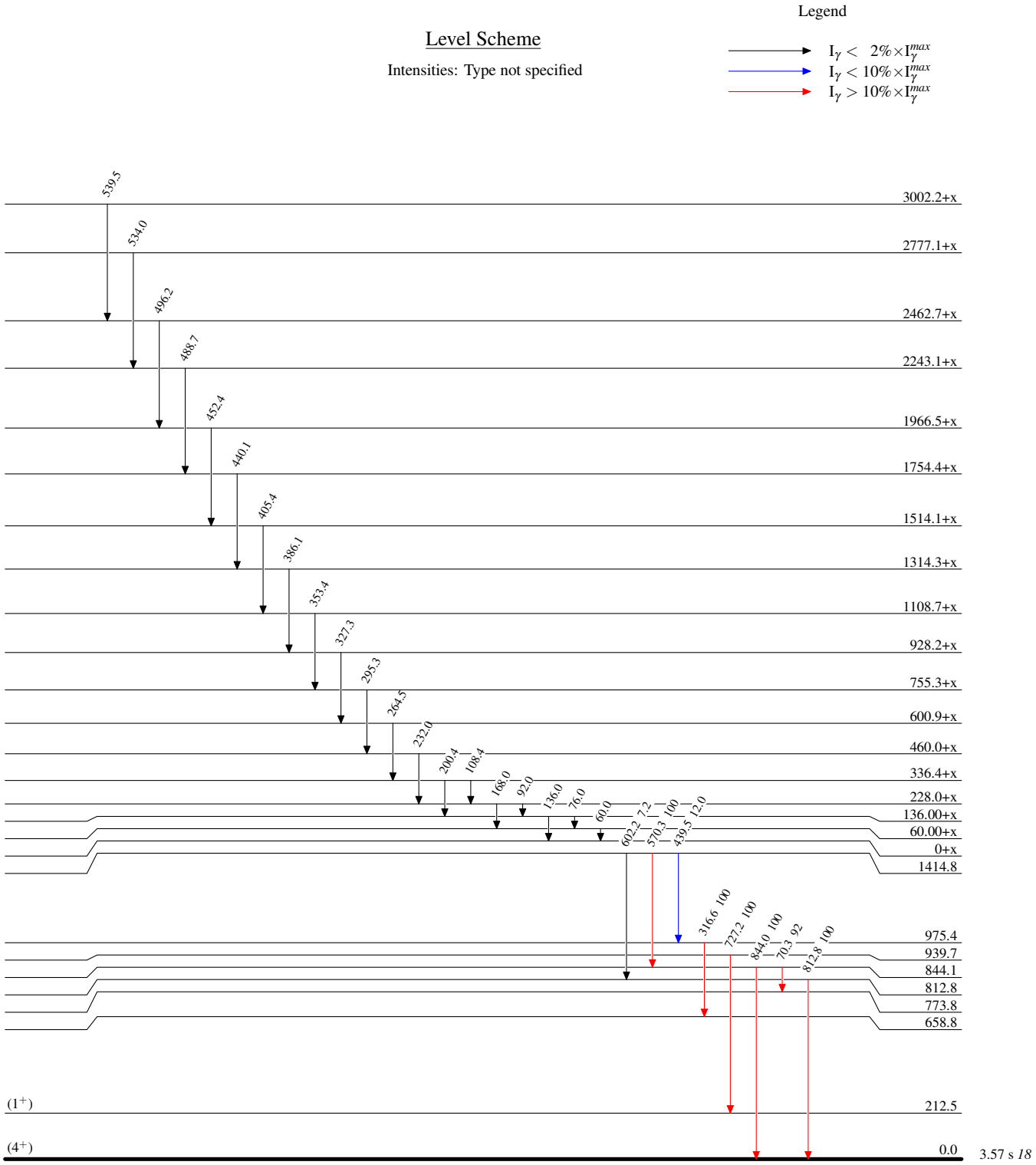
† From an intensity balance argument in ^{152}Ce β^- decay.

‡ 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.

Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified

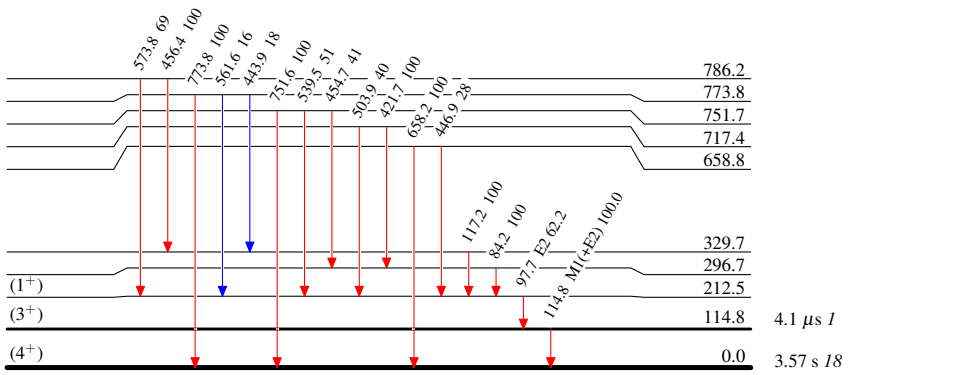


$^{152}_{59}Pr_{93}$

Adopted Levels, Gammas

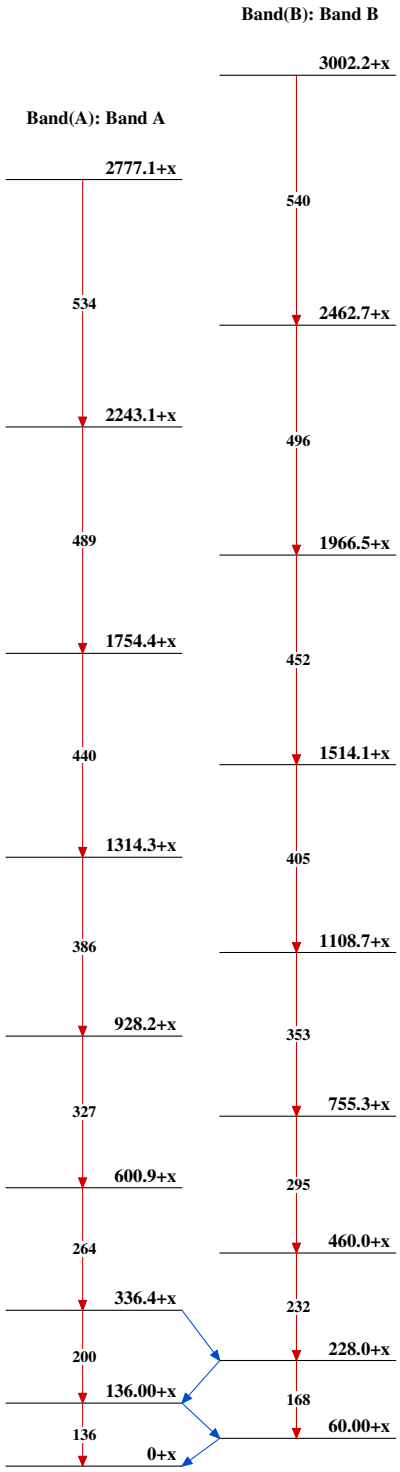
Level Scheme (continued)

Intensities: Type not specified



$^{152}_{59}Pr_{93}$

Adopted Levels, Gammas



$^{152}_{59}Pr_{93}$