Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 113,715 (2012)	31-May-2011

Q(β^-)=934.1 *14*; S(n)=7351.1 *20*; S(p)=5824.3 *19*; Q(α)=1735.6 *25* 2012Wa38
Note: Current evaluation has used the following Q record 934.1 147351 2 *5824.4 181736* 3 2011AuZZ,2003Au03.
Q(β^-)=1733.0 *26* (2003Au03).
Others: ^{139}La(α,γ) cross-section measurement (2010Av05). Reaction cross section calculations: 1995Li33, 1995Cv01, 1992Be26, 1991Cv01.

^{143}Pr Levels

Cross Reference (XREF) Flags

- A ^{143}Ce β^- decay
- B ^{142}Ce(p,p′)
- C ^{144}Nd(d,^{3}He)

E(level)	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	7/2$^+$	13.57 d *2*	A C	%β^-=100 μ=+2.701 *4* (1994Ii01,2011StZZ) Q=+0.77 *16* (1994Ii01,2011StZZ) μ: Colinear fast beam laser (1994Ii01). Q: Colinear fast beam laser (1994Ii01). T$_{1/2}$: weighted average: 13.59 d *4* (1957Pe09), 13.59 d *10* (1963Ho15), 13.55 d *2* (1965Is03), 13.57 d *2* (1971Ba28). Other: 13.76 d *5* (1957Wr37). J$^\pi$: atomic beam (1976Fu06), γ from 5/2$^+$ is M1+E2. μ,Q: from 1994Ii01, collinear fast-beam LASER spectroscopy (CFBLS).
57.356 *7*	5/2$^+$	4.14 ns *5*	A C	μ=+3.4 *1* (1977Ne12,2011StZZ) T$_{1/2}$: weighted average: 4.20 ns *7* (1963Bo22), 4.17 ns *9* (1963Gr38), 4.16 ns *7* (1965Na06), 4.05 ns *12* (1969MuZO). J$^\pi$: log *ft*=7.7 via 3/2$^-$ parent; analysis of μ; γ to 7/2 is D+Q. μ: Time dependent perturbed angular correlation (1977Ne12). Others values: +3.28 *13* (1964Ko15), +2.60 *20* (1966Zm01). Others: 1989Ra17.
298			C	
350.622 *4*	3/2$^+$	59 ps *10*	A	T$_{1/2}$: average: 49 ps *7* (1966Go20), 68 ps *8* (1969MuZO). J$^\pi$: γ ray to 5/2$^+$ is M1+E2, $\beta\gamma(\theta)$ is isotropic and rules out 7/2, $\gamma\gamma(\theta)$ rules out J=5/2 (1977Ra18).
490.362 *7*	7/2$^+$		A	J$^\pi$: γ ray to 7/2$^+$ is M1+E2, γ ray to 3/2$^+$ is E2. log $f^{1u}t$>8.5 fr.
614.22 *2*	5/2$^+$,7/2$^+$		A	J$^\pi$: γ ray to 5/2$^+$ is E2(+M1), branching ratio (1989Ku13).
721.923 *1*	5/2$^+$		A C	J$^\pi$: γ ray to 7/2$^+$ is M1, log *ft*=7.1 via 3/2$^-$ parent.
740.26 *2*	(1/2)$^+$		A	J$^\pi$: γ ray to 3/2$^+$ is M1,E2. No γ ray to 7/2$^+$ g.s.
787.33 *9*			A	
848.42 *2*			A	
937.82 *1*	3/2$^+$,5/2$^+$		A C	J$^\pi$: γ ray to 7/2$^+$ is E2, γ ray to 3/2$^+$ is M1.
1014.3 *1*			A	
1060.21 *2*	5/2$^+$,3/2$^+$		A	J$^\pi$: γ ray to 5/2$^+$ is M1, log *ft*=8.1 via 3/2$^-$ parent.
1156.94 *2*	1/2$^+$,3/2$^+$		A C	J$^\pi$: γ ray to 3/2$^+$ is M1, γ ray to 1/2$^+$, no γ ray to J>3/2.
1160.58 *2*	(3/2)$^+$		A C	J$^\pi$: γ ray to 5/2$^+$ is M1, very weak γ ray to 7/2$^+$.
1236			C	
1381.84 *3*	5/2$^+$,3/2$^+$		A C	J$^\pi$: γ ray to 3/2$^+$ is M1, γ ray to 7/2$^+$.
1397.40 *4*	3/2$^+$,5/2$^+$		A	J$^\pi$: γ ray to 3/2$^+$ is M1, γ ray to 7/2$^+$.
1526			C	
1980			C	
2141			C	
2512			C	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{143}Pr Levels (continued)

E(level)	J^{π}	$T_{1/2}$	XREF	E(level)	J^{π}	$T_{1/2}$	XREF
15668	$3/2^{-}$†	86† keV *20*	B	16826	$3/2^{-}$†	60† keV *20*	B
15687	$7/2^{-}$†	84† keV *5*	B	16859	$3/2^{-}$,$(1/2)^{-}$†	34† keV *20*	B
16478	$3/2^{-}$†	110† keV *10*	B	16869	$(5/2)^{-}$†	102† keV *30*	B
16536	$(1/2)^{-}$†	80† keV *10*	B	16957	$(5/2)^{-}$†	95† keV *20*	B

† From analysis of σ (E,θ) of IAR in (p,p′), $T_{1/2}$ value is total Γ (1972Le17).

Adopted Levels, Gammas (continued)

$\gamma(^{143}Pr)$

All data are from ^{143}Ce β^- decay.

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	δ	$\alpha^\dagger$	Comments
57.356	5/2$^+$	57.356 *7*	100	0.0	7/2$^+$	M1+E2	+0.039 *8*	6.47	α(K)=5.48 *8*; α(L)=0.777 *13*; α(M)=0.164 *3*; α(N+..)=0.0429 *7* α(N)=0.0366 *6*; α(O)=0.00587 *9*; α(P)=0.000422 *6* B(M1)(W.u.)=0.00377 *7*; B(E2)(W.u.)=1.0 *5*
350.622	3/2$^+$	293.266 *2*	100.0 *3*	57.356	5/2$^+$	M1+E2	+0.77 *10*	0.0620 *12*	α(K)=0.0518 *12*; α(L)=0.00806 *14*; α(M)=0.00172 *3*; α(N+..)=0.000445 *8* α(N)=0.000382 *7*; α(O)=5.98×10^{-5} *9*; α(P)=3.76×10^{-6} *11* B(M1)(W.u.)=0.0082 *16*; B(E2)(W.u.)=33 *8*
		350.619 *3*	7.55 *6*	0.0	7/2$^+$	E2		0.0312	α(K)=0.0253 *4*; α(L)=0.00467 *7*; α(M)=0.001008 *15*; α(N+..)=0.000258 *4* α(N)=0.000222 *4*; α(O)=3.38×10^{-5} *5*; α(P)=1.691×10^{-6} *24* B(E2)(W.u.)=2.7 *5*
490.362	7/2$^+$	139.742 *17*	3.6 *2*	350.622	3/2$^+$	E2		0.649	α(K)=0.441 *7*; α(L)=0.1634 *23*; α(M)=0.0365 *6*; α(N+..)=0.00907 *13* α(N)=0.00791 *11*; α(O)=0.001128 *16*; α(P)=2.47×10^{-5} *4*
		432.999 *6*	7.3 *2*	57.356	5/2$^+$	M1		0.0243	α(K)=0.0208 *3*; α(L)=0.00276 *4*; α(M)=0.000580 *9*; α(N+..)=0.0001523 *22* α(N)=0.0001298 *19*; α(O)=2.10×10^{-5} *3*; α(P)=1.569×10^{-6} *22*
		490.368 *5*	100 *1*	0.0	7/2$^+$	M1+E2		0.015 *3*	α(K)=0.013 *3*; α(L)=0.00180 *21*; α(M)=0.00038 *5*; α(N+..)=9.9×10^{-5} *12* α(N)=8.5×10^{-5} *10*; α(O)=1.35×10^{-5} *18*; α(P)=9.1×10^{-7} *23*
614.22	5/2$^+$,7/2$^+$	556.87 *1*	100 *5*	57.356	5/2$^+$	E2(+M1)		0.0107 *23*	α(K)=0.0091 *20*; α(L)=0.00128 *19*; α(M)=0.00027 *4*; α(N+..)=7.0×10^{-5} *10* α(N)=6.0×10^{-5} *9*; α(O)=9.6×10^{-6} *15*; α(P)=6.6×10^{-7} *17*
		614.22 *3*	38 *4*	0.0	7/2$^+$				
721.923	5/2$^+$	231.550 *2*	37 *1*	490.362	7/2$^+$	E2(+M1)		0.121 *5*	α(K)=0.098 *9*; α(L)=0.018 *4*; α(M)=0.0038 *8*; α(N+..)=0.00098 *19* α(N)=0.00085 *17*; α(O)=0.000130 *20*; α(P)=6.9×10^{-6} *13*
		371.292 *29*	0.44 *5*	350.622	3/2$^+$	M1		0.0360	α(K)=0.0308 *5*; α(L)=0.00411 *6*; α(M)=0.000865 *13*; α(N+..)=0.000227 *4* α(N)=0.000193 *3*; α(O)=3.12×10^{-5} *5*; α(P)=2.33×10^{-6} *4*
		664.571 *15*	100 *1*	57.356	5/2$^+$	M1+(E2)		0.0069 *15*	α(K)=0.0059 *13*; α(L)=0.00080 *14*; α(M)=0.00017 *3*; α(N+..)=4.4×10^{-5} *8* α(N)=3.8×10^{-5} *7*; α(O)=6.0×10^{-6} *11*; α(P)=4.3×10^{-7} *11*
		721.929 *13*	95 *1*	0.0	7/2$^+$	M1		0.00682 *10*	α(K)=0.00585 *9*; α(L)=0.000765 *11*; α(M)=0.0001604 *23*;

$^{143}_{59}Pr_{84}$-3

Adopted Levels, Gammas (continued)

$\gamma(^{143}Pr)$ (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	$\alpha^\dagger$	Comments
								α(N+..)=4.21×10^{-5} *6* α(N)=3.59×10^{-5} *5*; α(O)=5.80×10^{-6} *9*; α(P)=4.38×10^{-7} *7*
740.26	(1/2)$^+$	389.64 *2*	100 *5*	350.622	3/2$^+$	M1,E2	0.027 *5*	α(K)=0.023 *5*; α(L)=0.00345 *18*; α(M)=0.00073 *3*; α(N+..)=0.000190 *10* α(N)=0.000163 *8*; α(O)=2.57×10^{-5} *19*; α(P)=1.7×10^{-6} *4*
		682.82 *9*	24 *5*	57.356	5/2$^+$			
787.33		729.87 *8*	100 *20*	57.356	5/2$^+$			
		787.40 *9*	100 *20*	0.0	7/2$^+$			
848.42		357.8 *2*	1.3 *5*	490.362	7/2$^+$			
		497.81 *2*	100 *6*	350.622	3/2$^+$			
		791.07 *2*	30 *1*	57.356	5/2$^+$			
937.82	3/2$^+$,5/2$^+$	197.6 *2*	0.25 *13*	740.26	(1/2)$^+$			
		447.45 *2*	5.8 *3*	490.362	7/2$^+$	[E2]	0.01532	α(K)=0.01264 *18*; α(L)=0.00211 *3*; α(M)=0.000451 *7*; α(N+..)=0.0001160 *17* α(N)=9.98×10^{-5} *14*; α(O)=1.541×10^{-5} *22*; α(P)=8.70×10^{-7} *13*
		587.20 *2*	25.9 *5*	350.622	3/2$^+$	M1	0.01130	α(K)=0.00969 *14*; α(L)=0.001275 *18*; α(M)=0.000268 *4*; α(N+..)=7.03×10^{-5} *10* α(N)=5.99×10^{-5} *9*; α(O)=9.67×10^{-6} *14*; α(P)=7.28×10^{-7} *11*
		880.46 *1*	100 *1*	57.356	5/2$^+$	M1	0.00424 *6*	α(K)=0.00364 *5*; α(L)=0.000473 *7*; α(M)=9.90×10^{-5} *14*; α(N+..)=2.60×10^{-5} *4* α(N)=2.22×10^{-5} *4*; α(O)=3.59×10^{-6} *5*; α(P)=2.72×10^{-7} *4*
		937.82 *1*	2.5 *1*	0.0	7/2$^+$	E2	0.00244 *4*	α(K)=0.00208 *3*; α(L)=0.000286 *4*; α(M)=6.01×10^{-5} *9*; α(N+..)=1.569×10^{-5} *22* α(N)=1.340×10^{-5} *19*; α(O)=2.14×10^{-6} *3*; α(P)=1.494×10^{-7} *21*
1014.3		523.0 *5*	100 *25*	490.362	7/2$^+$			
		956.9 *1*	75 *25*	57.356	5/2$^+$			
		1014.3 *3*	75 *25*	0.0	7/2$^+$			
1060.21	5/2$^+$,3/2$^+$	122.4 *1*	45 *6*	937.82	3/2$^+$,5/2$^+$			
		272.9 *2*	≤45	787.33				
		338.3 *2*	4.5 *23*	721.923	5/2$^+$			
		446.02 *9*	20 *4*	614.22	5/2$^+$,7/2$^+$			
		569.91 *9*	6.8 *23*	490.362	7/2$^+$			
		709.59 *5*	11.4 *17*	350.622	3/2$^+$			
		1002.85 *1*	100 *2*	57.356	5/2$^+$	M1	0.00312 *5*	α(K)=0.00268 *4*; α(L)=0.000347 *5*; α(M)=7.26×10^{-5} *11*; α(N+..)=1.91×10^{-5} *3* α(N)=1.624×10^{-5} *23*; α(O)=2.63×10^{-6} *4*; α(P)=2.00×10^{-7} *3*
		1060.22 *2*	48 *2*	0.0	7/2$^+$	M1+(E2)	0.0023 *5*	α(K)=0.0020 *4*; α(L)=0.00026 *5*; α(M)=5.5×10^{-5} *10*; α(N+..)=1.43×10^{-5} *25* α(N)=1.22×10^{-5} *21*; α(O)=2.0×10^{-6} *4*; α(P)=1.5×10^{-7} *3*
1156.94	1/2$^+$,3/2$^+$	416.57 *10*	24 *4*	740.26	(1/2)$^+$			

$^{143}_{59}Pr_{84}$-4

Adopted Levels, Gammas (continued)

γ(^{143}Pr) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	α†	Comments
1156.94	1/2+,3/2+	806.34 *2*	100 *3*	350.622	3/2+	M1+E2	0.0043 *9*	α(K)=0.0037 *8*; α(L)=0.00050 *9*; α(M)=0.000104 *18*; α(N+..)=2.7×10^{-5} *5* α(N)=2.3×10^{-5} *4*; α(O)=3.7×10^{-6} *7*; α(P)=2.7×10^{-7} *7*
1160.58	(3/2)+	438.43 *8*	1.0 *2*	721.923	5/2+			
		670.12 *7*	2.0 *4*	490.362	7/2+			
		809.98 *2*	7.5 *2*	350.622	3/2+			
		1103.25 *2*	100 *1*	57.356	5/2+	M1	0.00250 *4*	α(K)=0.00215 *3*; α(L)=0.000277 *4*; α(M)=5.79×10^{-5} *9*; α(N+..)=1.563×10^{-5} *22* α(N)=1.297×10^{-5} *19*; α(O)=2.10×10^{-6} *3*; α(P)=1.598×10^{-7} *23*; α(IPF)=4.02×10^{-7} *6*
		1160.58 *6*	0.58 *8*	0.0	7/2+			
1381.84	5/2+,3/2+	594.5 *4*	≤11	787.33				
		767.70 *6*	15.7 *17*	614.22	5/2+,7/2+			
		891.47 *7*	40.4 *43*	490.362	7/2+			
		1031.22 *3*	100.0 *43*	350.622	3/2+	M1	0.00292 *4*	α(K)=0.00251 *4*; α(L)=0.000324 *5*; α(M)=6.79×10^{-5} *10*; α(N+..)=1.785×10^{-5} *25* α(N)=1.520×10^{-5} *22*; α(O)=2.46×10^{-6} *4*; α(P)=1.87×10^{-7} *3*
		1324.48 *3*	7.8 *2*	57.356	5/2+			
		1382 *1*	1.9 *6*	0.0	7/2+			
1397.40	3/2+,5/2+	675.5 *5*	7.1 *70*	721.923	5/2+			
		907.1 *1*	10.7 *35*	490.362	7/2+			
		1046.78 *4*	100 *7*	350.622	3/2+	M1	0.00282 *4*	α(K)=0.00243 *4*; α(L)=0.000313 *5*; α(M)=6.56×10^{-5} *10*; α(N+..)=1.723×10^{-5} *25* α(N)=1.468×10^{-5} *21*; α(O)=2.38×10^{-6} *4*; α(P)=1.81×10^{-7} *3*
		1340.1 *1*	25.7 *11*	57.356	5/2+			

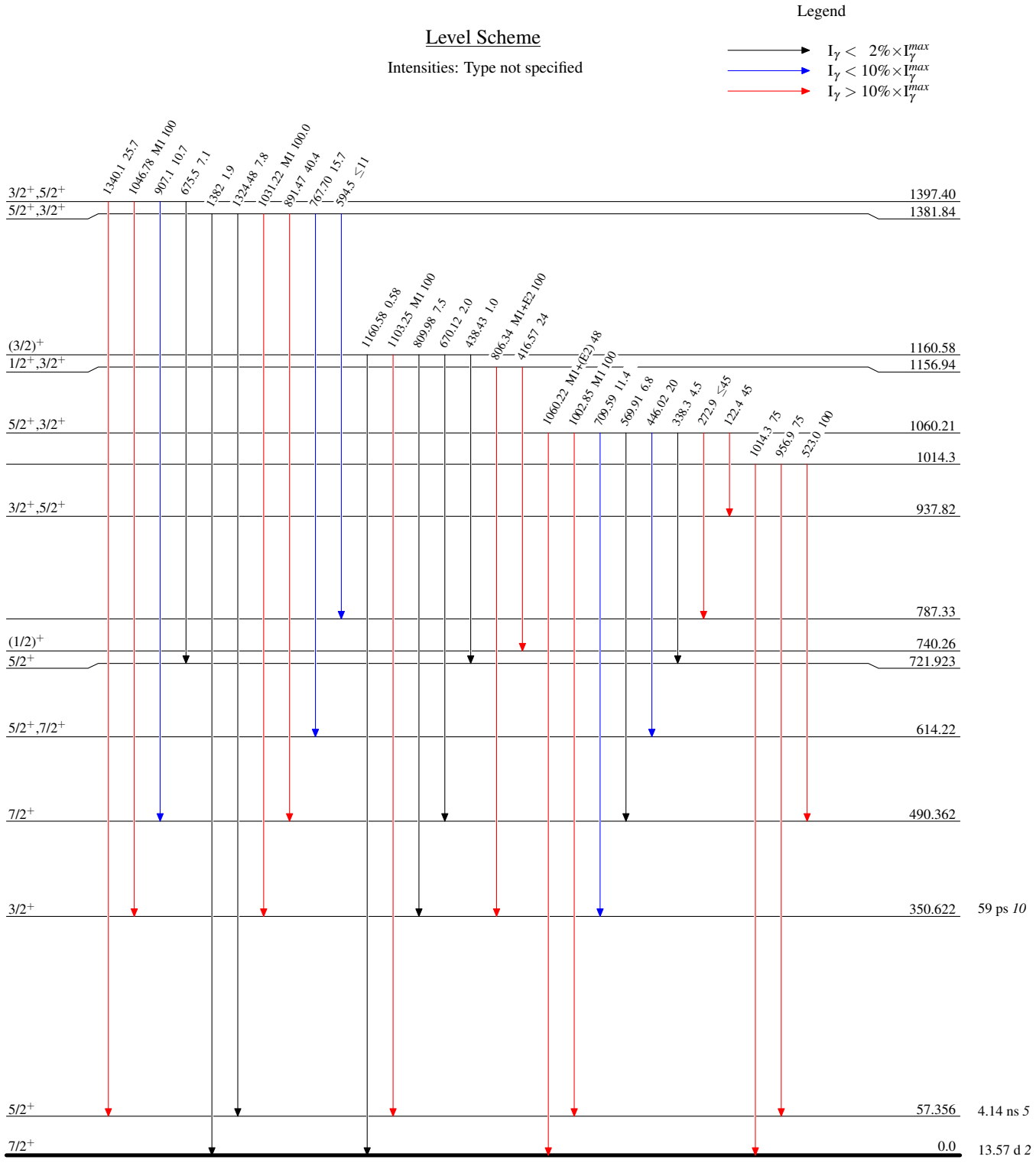
† Additional information 1.

$^{143}_{59}Pr_{84}$-5

Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified

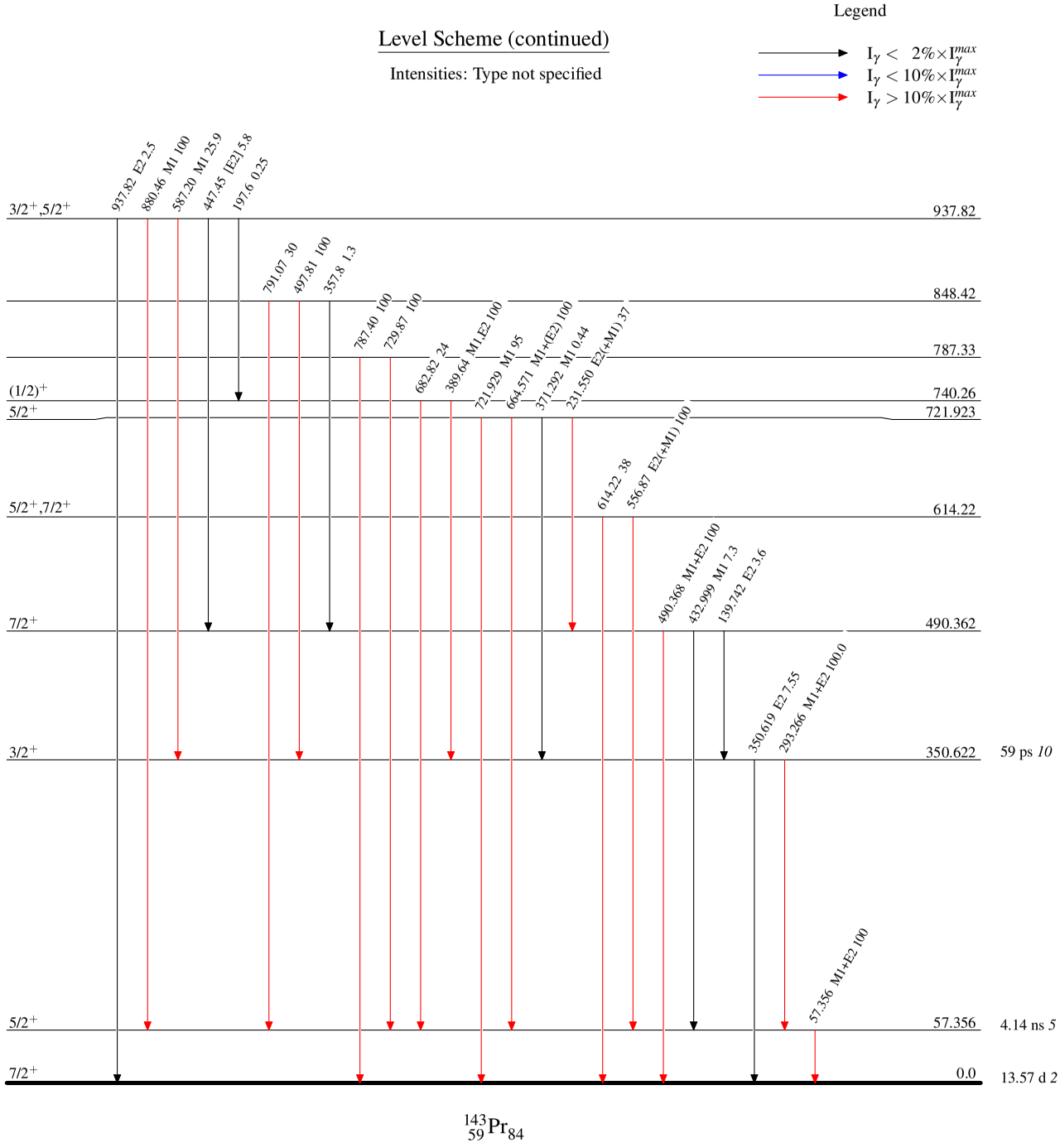


$^{143}_{59}Pr_{84}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



$^{143}_{59}Pr_{84}$