Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	T. D. Johnson, D. Symochko(a), M. Fadil(b), and J. K. Tuli	NDS 112,1949 (2011)	1-Jun-2010

Q(β^-)=−2155 *24*; S(n)=8.69×10^3 *3*; S(p)=4238 *24*; Q(α)=−4.4×10^2 *3* 2012Wa38
Note: Current evaluation has used the following Q record −2.17E+3 3 *8.71×10^3 3* 4250 *30* −450 *30* 2011AuZZ.
Q(β^-n)=−13290 *3*, Q(εp)=−2420 *3* 2011AuZZ.
Values in 2003Au03: Q(β^-)=−2160 *3*, S(n)=8710 *3*, S(p)=4.25E3 *3*, Q(α)=−450 *3*, Q(β^-n)=−13290 *3*, Q(εp)=−2420 *3*.

Ionized atom $T_{1/2}$:

2009Wi09: Be(^{152}Sm,X): Decay of $^{142}Pm^{61+}$, $^{142}Pm^{60+}$ and $^{142}Pm^{59+}$ Experiment: Beryllium target of 2.513 gm/cm^2 was bombarded with a 607.4 MeV/A ^{152}Sm beam delivered by the heavy-ion accelerator (SIS) at GSI. The fully ionized ^{142}Pm ions were separated in flight with FRS employing a two-fold magnetic rigidity analysis and 731 mg/cm^2 Al energy degrader. The ^{142}Pm ions were injected into the storage ring ESR and stored in ultra-high vacuum. Identification of cooled $^{142}Pm^{59+}$, $^{142}Pm^{60+}$ and $^{142}Pm^{61+}$ ions and their decay products were achieved using the Schottky Mass Spectrometry technique. Half lives presented are correlated to the average decay with cooler currents at 50mA and 250mA. Decay constants associated with individual cooler currents can be found in the reference. $T_{1/2}$=56 s *3* for $^{142}Pm^{61+}$ (fully-stripped ions); only β^+ decay mode is possible for fully-stripped ions. For $^{142}Pm^{60+}$ (H-like ions): $T_{1/2}(\beta^++\varepsilon)$=39.2 s *6*; $T_{1/2}(\beta^+)$=55.0 s *13*; $T_{1/2}(\varepsilon)$=135.9 s *27* and *%ε/(%ε+%β$^+$)=29.0 % 13). For $^{142}Pm^{59+}$ (He-like ions): $T_{1/2}(\beta^++\varepsilon)$=39.6 s 14; $T_{1/2}(\beta^+)$=49.9 s 22, $T_{1/2}(\varepsilon)$=193 s 5 and %ε/(%ε+%β$^+$)=20.2 % 10.*

2008Ve06: ^{124}Sn(^{23}Na,5n): ^{142}Pm was produced by bombardment of a 400 μg/cm^2 thick ^{124}Sn target with 95 MeV ^{23}Na beams (average beam intensity 100 pnA). The reaction products moved through the Berkeley Gas-filled separator, which separated the ^{142}Pm from the beam and other products by their different magnetic rigidities. The ^{142}Pm ions were stopped in a 25 μm thick Al foil. The emitted γ and x rays were measured with an intrinsic Ge "clover" detector. This experiment searched for oscillations (time-modulation) in the ε decay probability in ^{142}Pm (neutral atom) isotope. Observation of a non-exponential ε decay was originally reported by 2008Li21: in the ε decay of ionized (hydrogen-like) ^{140}Pr and ^{142}Pm. $T_{1/2}$=40.68 s *53* from 2008Ve06 using a single-exponential decay function fit to the ^{142}Nd K_α x rays. Note that β^+ half-life was measured to be $T_{1/2}$=41.11 s *38*. This was obtained in 2008Ve06 using a single-exponential decay fit to the 511-keV line from annihilation radiation. The electron conversion half-life was measured here to be 40.68 s 53. In the decay curves of ^{142}Nd K_α x rays and annihilation radiation, no evidence of (statistically significant) oscillatory pattern was found by 2008Ve06. The authors conclude that any oscillation, not resolved in their experiment, must have an amplitude smaller by a factor of 31 than the one reported by 2008Li21. 2008Ve06 do, however, point out that ε decays of hydrogen-like ions (as used in 2008Li21) may in some, hitherto unknown way, differ from the ε decay of neutral atom used in 2008Ve06.

2008Li21: ^{9}Be(^{152}Sm,X): ion $T_{1/2}$ ^{142}Pm was produced by in-flight fragmentation of relativistic heavy projectiles. The beam was ^{152}Sm at 500-600 MeV/A bombarding a ^{9}Be target with thicknesses of 1 and 2 g/cm^2. Fragment mass separator (FRS) was used to identify ^{142}Pm residues. Measured half-life of (hydrogen-like) $^{142}Pm^{60+}$ ions using time-resolved Schottky mass spectrometry at GSI facility. 2008Li21 report observing non-exponential decay pattern of hydrogen-like ions with a time-modulation period of ≈7s. All half-lives given here are for (hydrogen-like) $^{142}Pm^{60+}$ ion. $T_{1/2}$=40.7 s +24−20 from decay constant λ=0.0170 s^{-1} *9* (2008Li21) using a single-exponential decay function. $T_{1/2}$ from decay constant λ=0.0240 s^{-1} *42* or 28.9 s *+61−43* using a single-exponential decay function, but only those data were fitted that were collected within 33 s after injections of the ions. $T_{1/2}$ decay constant λ=0.0224 s^{-1} *42* or 30.9 s *+72−49* using a single-exponential decay and superimposed periodic time modulation functions fit. Q(ε)=4830 keV (2008Li21) for decay of $^{142}Pm^{60+}$ as compared to 4798 *25* (2003Au03) for decay of neutral ^{142}Pm.

^{142}Pm Levels

Cross Reference (XREF) Flags

A	^{142}Pm IT decay	D	^{142}Nd(d,2nγ) E=13.5 MeV
B	^{142}Sm ε decay	E	(HI,xnγ)
C	^{142}Nd(p,nγ) E=10 MeV		

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Adopted Levels, Gammas (continued)

^{142}Pm Levels (continued)

E(level)	J^{π} †	$T_{1/2}$	XREF	Comments
0.0	1^+	40.5 s *5*	ABCDE	%ε+%β^+=100 $T_{1/2}$: for neutral atom, from 1970Ar17; others: 40.5 s *10* (1968Bl14), 40 s *3* (1973Ra01). $T_{1/2}$: 56 s *3* for $^{142}Pm^{61+}$ 2009Wi09. $T_{1/2}$: $(\beta^+ + \varepsilon)$=39.2 s *6* $^{142}Pm^{60+}$ 2009Wi09. $T_{1/2}$: (β^+)=55.0 s *13* $^{142}Pm^{60+}$ 2009Wi09. $T_{1/2}$: (ε)=135.9 s *27* $^{142}Pm^{60+}$ 2009Wi09. $T_{1/2}$: $(\beta^+ + \varepsilon)$=39.6 s *14* $^{142}Pm^{59+}$ 2009Wi09. $T_{1/2}$: (β^+)=49.9 s *22* $^{142}Pm^{59+}$ 2009Wi09. $T_{1/2}$: (ε)=193 s *5* $^{142}Pm^{59+}$ 2009Wi09. $T_{1/2}$: %ε/(%ε+%β^+)=20.2 % *10* $^{142}Pm^{59+}$ 2009Wi09. $T_{1/2}$: 40.7 s *+24−20* $^{142}Pm^{60+}$ 2008Ve06. J^{π}: log *ft*≤5.3 to 0^+ and 2^+ Suggested earlier as 1^+ in 1970Ha29 from strong beta decay.
208.52 *8*	$(2)^+$		A CDE	
240.98 *8*	$(3)^+$	1.1 ns *3*	A CDE	$T_{1/2}$: from (d,2nγ).
412.01 *12*	$(3)^+$		A CDE	
449.47 *13*	$(5)^+$	16.5 ns *15*	A CDE	$T_{1/2}$: from (d,2nγ).
460.00 *12*	$(4)^+$		CDE	
496.30 *18*	$(2)^+$		CD	
513.12 *13*	$(3)^+$		CD	
618.30 *10*	$(2)^+$		CD	
678.30 *10*	$(2)^-$		BCD	
706.80 *20*	$(4)^+$		CD	
860.2? *4*			CD	
883.17 *16*	$(8)^-$	2.0 ms *2*	A CDE	%IT=100 $T_{1/2}$: from (d,2nγ) (1976Fu07); others: 2.20 ms (1972Ra42) (α,3nγ), 2.36 ms (1971Go21) (α,3nγ), 2.2 ms *2* (1974KeZE,1975KeZN) (α,3nγ), (p,2nγ).
980.80 *15*	$(3)^-$		CD	
998.01 *16*	(5^-)		CDE	
1024.36 *16*	$(6)^-$		CDE	
1076.70 *18*	(4^-)		CD	
1078.30? *16*	(5)		CD	
1163.80 *23*	(4^-)		CD	
1185.20 *23*	(5^-)		CD	
1190.82 *21*	$(7)^-$		CDE	
1237.1? *4*			CD	
1310.1 *5*	(9^-)		E	
1335.0? *11*			D	E(level),J^{π}: From figure 3 of 2004Li49; not listed in authors′ table I. $T_{1/2}$: From 2002Bh02, except for the g.s. which is the adopted value. E(level): From least-squares fit to Eγ′s.
1765.4 *4*	(9^+)		E	
1809.4 *5*	(10^+)		E	
2190.1 *6*	(11^+)		E	
2828.7 *6*	(13^-)	67 μs *5*	E	$T_{1/2}$: 2004Li49 assigned this level as the 67 μs isomer, based upon the absence of any strong coincidence between the γ-rays below and above this level. This isomer was placed at 926.2 earlier based on (α,3nγ) and (^{10}B,4nγ) (1975KeZN).
3143.8 *7*	(14^-)	<0.69 ns	E	
3300.3 *7*	(12^+)		E	
3507.4 *9*			E	
3738.0 *8*	(13^+)		E	
3798.3 *8*	(13^+)		E	
3820.4 *7*	(14)	0.8 ns *5*	E	
3872.3 *7*	(15)		E	
3886.6 *7*	(14^-)		E	

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Adopted Levels, Gammas (continued)

^{142}Pm Levels (continued)

E(level)	J$^{\pi}$†	$T_{1/2}$	XREF	E(level)	J$^{\pi}$†	XREF
4015.2 *8*	(16)	9 ns *4*	E	4970.0 *9*	(16)	E
4061.9 *8*	(15)		E	5008.4 *10*	(18)	E
4073.1 *9*			E	5031.6 *10*		E
4185.9 *9*			E	5356.8 *12*		E
4236.6 *8*	(17)	2.8 ns *9*	E	5615.2 *10*	(19)	E
4325.1 *10*			E	5618.0 *10*	(19)	E
4339.9 *9*	(16)		E	5672.4 *15*		E
4391.7 *8*			E	5810.3 *10*	(20)	E
4640.5 *12*			E	6475.6 *12*	(21)	E
4774.3 *14*			E	6815.3 *12*	(21)	E
4787.1 *11*			E	7030.3 *15*	(22)	E

† Values adopted by 1976Fu07 and based on simultaneous considerations of the γ-ray multipolarities deduced from α, γ(θ), branching observed in (d,2nγ), Iγ in (d,2nγ) and (p,nγ), and shell model. J^{π} for levels seen only in (HI,xnγ) are from that reaction based on DCO measurements.

γ(^{142}Pm)

E_i(level)	J^{π}_i	E_{γ}‡	I_{γ}‡	E_f	J^{π}_f	Mult.#	α†	Comments
208.52	(2)$^+$	208.5@ *1*	100@	0.0	1$^+$	M1	0.198	α(K)=0.1681 *24*; α(L)=0.0233 *4*; α(M)=0.00497 *7*; α(N+..)=0.001301 *19* α(N)=0.001121 *16*; α(O)=0.0001693 *24*; α(P)=1.076×10^{-5} *16*
240.98	(3)$^+$	32.45 *10*	25.2	208.52	(2)$^+$	M1	6.31 *11*	B(M1)(W.u.)=0.049 *14* α(L)=4.97 *9*; α(M)=1.061 *18*; α(N+..)=0.277 *5* α(N)=0.239 *4*; α(O)=0.0360 *6*; α(P)=0.00225 *4*
		241.0 *1*	100	0.0	1$^+$	E2	0.1091	B(E2)(W.u.)=4.8 *14* α(K)=0.0828 *12*; α(L)=0.0206 *3*; α(M)=0.00458 *7*; α(N+..)=0.001152 *17* α(N)=0.001010 *15*; α(O)=0.0001380 *20*; α(P)=4.32×10^{-6} *6*
412.01	(3)$^+$	171.0 *2*	15	240.98	(3)$^+$	M1,E2	0.342 *6*	α(K)=0.27 *3*; α(L)=0.060 *21*; α(M)=0.013 *5*; α(N+..)=0.0034 *12* α(N)=0.0030 *11*; α(O)=0.00041 *12*; α(P)=1.5×10^{-5} *4*
		203.5 *1*	100	208.52	(2)$^+$	(M1,E2)	0.201 *11*	α(K)=0.160 *20*; α(L)=0.032 *8*; α(M)=0.0071 *18*; α(N+..)=0.0018 *5* α(N)=0.0016 *4*; α(O)=0.00022 *5*; α(P)=9.3×10^{-6} *23*
449.47	(5)$^+$	37.5		412.01	(3)$^+$	[E2]	113.1	B(E2)(W.u.)≈3.7 ce(L)/(γ+ce)=0.770 *8*; ce(M)/(γ+ce)=0.178 *4*; ce(N+)/(γ+ce)=0.0432 *9* ce(N)/(γ+ce)=0.0385 *8*; ce(O)/(γ+ce)=0.00474 *10*; ce(P)/(γ+ce)=3.40×10^{-6} *7* If branching≈0.04.
		208.5@ *1*	100@	240.98	(3)$^+$	[E2]	0.1759	B(E2)(W.u.)=1.61 *15* α(K)=0.1297 *19*; α(L)=0.0361 *6*; α(M)=0.00810 *12*; α(N+..)=0.00203 *3* α(N)=0.00178 *3*; α(O)=0.000240 *4*; α(P)=6.57×10^{-6} *10*
460.00	(4)$^+$	219.0 *1*	100	240.98	(3)$^+$	M1	0.1729	α(K)=0.1471 *21*; α(L)=0.0204 *3*; α(M)=0.00434 *7*; α(N+..)=0.001137 *16*

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Adopted Levels, Gammas (continued)

$\gamma(^{142}Pm)$ (continued)

E_i(level)	J^π_i	E_γ[‡]	I_γ[‡]	E_f	J^π_f	Mult.[#]	α[†]	Comments
								α(N)=0.000979 *14*; α(O)=0.0001479 *21*; α(P)=9.41×10^{-6} *14*
496.30	(2)$^+$	255.4 *3*	100	240.98	(3)$^+$			
		287.7 *3*	82	208.52	(2)$^+$			
		496.3 *3*	85	0.0	1$^+$	(M1)	0.0202	α(K)=0.01728 *25*; α(L)=0.00233 *4*; α(M)=0.000496 *7*; α(N+..)=0.0001298 *19* α(N)=0.0001118 *16*; α(O)=1.693×10^{-5} *24*; α(P)=1.091×10^{-6} *16*
513.12	(3)$^+$	304.6 *1*	100	208.52	(2)$^+$	M1,E2	0.062 *10*	α(K)=0.051 *10*; α(L)=0.00849 *20*; α(M)=0.00184 *7*; α(N+..)=0.000474 *12* α(N)=0.000412 *13*; α(O)=5.97×10^{-5} *13*; α(P)=3.0×10^{-6} *9*
618.30	(2)$^+$	377.3 *3*	52	240.98	(3)$^+$	M1	0.0408	α(K)=0.0348 *5*; α(L)=0.00474 *7*; α(M)=0.001009 *15*; α(N+..)=0.000264 *4* α(N)=0.000227 *4*; α(O)=3.44×10^{-5} *5*; α(P)=2.21×10^{-6} *4*
		618.3[@] *1*	100[@]	0.0	1$^+$	M1	0.01168	α(K)=0.00999 *14*; α(L)=0.001337 *19*; α(M)=0.000284 *4*; α(N+..)=7.44×10^{-5} *11* α(N)=6.41×10^{-5} *9*; α(O)=9.71×10^{-6} *14*; α(P)=6.28×10^{-7} *9*
678.30	(2)$^-$	678.3 *1*	100	0.0	1$^+$	E1	0.00212 *3*	α(K)=0.00182 *3*; α(L)=0.000236 *4*; α(M)=4.99×10^{-5} *7*; α(N+..)=1.300×10^{-5} *19* α(N)=1.121×10^{-5} *16*; α(O)=1.684×10^{-6} *24*; α(P)=1.057×10^{-7} *15*
706.80	(4)$^+$	246.8 *3*	100	460.00	(4)$^+$			
		294.8 *3*	65	412.01	(3)$^+$			
		465.8 *3*	94	240.98	(3)$^+$	M1	0.0238	α(K)=0.0203 *3*; α(L)=0.00274 *4*; α(M)=0.000583 *9*; α(N+..)=0.0001527 *22* α(N)=0.0001315 *19*; α(O)=1.99×10^{-5} *3*; α(P)=1.282×10^{-6} *18*
860.2?		448.2 *3*	100	412.01	(3)$^+$			
883.17	(8)$^-$	433.7 *1*	100	449.47	(5)$^+$	E3	0.0559	B(E3)(W.u.)=0.166 *17* α(K)=0.0407 *6*; α(L)=0.01183 *17*; α(M)=0.00267 *4*; α(N+..)=0.000675 *10* α(N)=0.000591 *9*; α(O)=8.11×10^{-5} *12*; α(P)=2.46×10^{-6} *4*
980.80	(3)$^-$	302.5 *1*	100	678.30	(2)$^-$	M1,E2	0.063 *10*	α(K)=0.052 *11*; α(L)=0.00868 *22*; α(M)=0.00188 *8*; α(N+..)=0.000485 *13* α(N)=0.000421 *14*; α(O)=6.10×10^{-5} *12*; α(P)=3.1×10^{-6} *9*
998.01	(5$^-$)	538.0 *1*	100	460.00	(4)$^+$	(E1)	0.00350 *5*	α(K)=0.00300 *5*; α(L)=0.000393 *6*; α(M)=8.31×10^{-5} *12*; α(N+..)=2.16×10^{-5} *3* α(N)=1.87×10^{-5} *3*; α(O)=2.79×10^{-6} *4*; α(P)=1.727×10^{-7} *25*
1024.36	(6)$^-$	26.4[&] *3*	15	998.01	(5$^-$)			
		574.9 *1*	100	449.47	(5)$^+$	E1	0.00302 *5*	α(K)=0.00259 *4*; α(L)=0.000338 *5*; α(M)=7.16×10^{-5} *10*; α(N+..)=1.86×10^{-5} *3* α(N)=1.608×10^{-5} *23*; α(O)=2.41×10^{-6} *4*; α(P)=1.496×10^{-7} *21*
1076.70	(4$^-$)	95.9 *1*		980.80	(3)$^-$			
1078.30?	(5)	618.3[@] *1*	100[@]	460.00	(4)$^+$			
1163.80	(4$^-$)	485.5 *2*	100	678.30	(2)$^-$	(E2)	0.01330	α(K)=0.01095 *16*; α(L)=0.00185 *3*; α(M)=0.000402

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Adopted Levels, Gammas (continued)

$\gamma(^{142}Pm)$ (continued)

E_i(level)	J^π_i	E_γ‡	I_γ‡	E_f	J^π_f	Mult.#	α†	Comments
								6; α(N+..)=0.0001032 15 α(N)=8.96×10^{-5} 13; α(O)=1.293×10^{-5} 19; α(P)=6.34×10^{-7} 9
1185.20	(5^-)	108.5 2	80	1076.70	(4^-)			
		204.4 3	100	980.80	$(3)^-$			
1190.82	$(7)^-$	166.5 2	100	1024.36	$(6)^-$	M1,E2	0.372 8	α(K)=0.29 3; α(L)=0.067 24; α(M)=0.015 6; α(N+..)=0.0037 14 α(N)=0.0033 12; α(O)=0.00045 14; α(P)=1.6×10^{-5} 4
		192.7 3	38	998.01	(5^-)			
1237.1?		160.4 3	100	1076.70	(4^-)			
1310.1	(9^-)	426.8 6	100.0	883.17	$(8)^-$			
1335.0?		337	100	998.01	(5^-)			
1765.4	(9^+)	455.2 6	6.901	1310.1	(9^-)			
		882.2 3	100.0	883.17	$(8)^-$			
1809.4	(10^+)	44.0 3	100.0	1765.4	(9^+)	M1+E2	27 25	α(L)=21 19; α(M)=5 5; α(N+..)=1.2 11 α(N)=1.1 10; α(O)=0.13 12; α(P)=0.0006 3
2190.1	(11^+)	380.8 3	100.0	1809.4	(10^+)			
2828.7	(13^-)	638.6 3	100.0	2190.1	(11^+)	[M2+E3]	0.024 8	α(K)=0.020 7; α(L)=0.0033 6; α(M)=0.00072 12; α(N+..)=0.00019 4 α(N)=0.00016 3; α(O)=2.4×10^{-5} 5; α(P)=1.3×10^{-6} 5
		1019.4	25.08	1809.4	(10^+)	[E3]	0.00481 7	α(K)=0.00399 6; α(L)=0.000640 9; α(M)=0.0001385 20; α(N+..)=3.59×10^{-5} 5 α(N)=3.10×10^{-5} 5; α(O)=4.57×10^{-6} 7; α(P)=2.50×10^{-7} 4
3143.8	(14^-)	315.1 3	100.00	2828.7	(13^-)			
3300.3	(12^+)	1110.4 9	100.0	2190.1	(11^+)	M1+E2	0.0024 5	α(K)=0.0020 5; α(L)=0.00027 5; α(M)=5.8×10^{-5} 11; α(N+..)=1.6×10^{-5} 3 α(N)=1.30×10^{-5} 24; α(O)=2.0×10^{-6} 4; α(P)=1.2×10^{-7} 3; α(IPF)=5.00×10^{-7} 22
		1490.6 9	<22.73	1809.4	(10^+)			
3507.4		1317.2 9	<100.0	2190.1	(11^+)			
3738.0	(13^+)	437.6 9	100.0	3300.3	(12^+)	D		
		1548.0 9	64.52	2190.1	(11^+)	Q		
3798.3	(13^+)	498.0 9	100.0	3300.3	(12^+)			
		1608.2 9	57.89	2190.1	(11^+)			
3820.4	(14)	991.6 3	100.0	2828.7	(13^-)			
3872.3	(15)	52.0 6	50.50	3820.4	(14)	D		
		728.5 6	100.0	3143.8	(14^-)			
3886.6	(14^-)	88.4 9	0.000	3798.3	(13^+)			
		148.7 9	55.17	3738.0	(13^+)	D		
		742.8 6	96.55	3143.8	(14^-)			
		1057.9 6	100.0	2828.7	(13^-)	M1+E2	0.0026 6	α(K)=0.0023 5; α(L)=0.00030 6; α(M)=6.4×10^{-5} 12; α(N+..)=1.7×10^{-5} 4 α(N)=1.5×10^{-5} 3; α(O)=2.2×10^{-6} 5; α(P)=1.4×10^{-7} 4
4015.2	(16)	142.9 3	100.0	3872.3	(15)			
4061.9	(15)	175.4 6	100.00	3886.6	(14^-)			
		241.2 9	28.05	3820.4	(14)			

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Adopted Levels, Gammas (continued)

$\gamma(^{142}Pm)$ (continued)

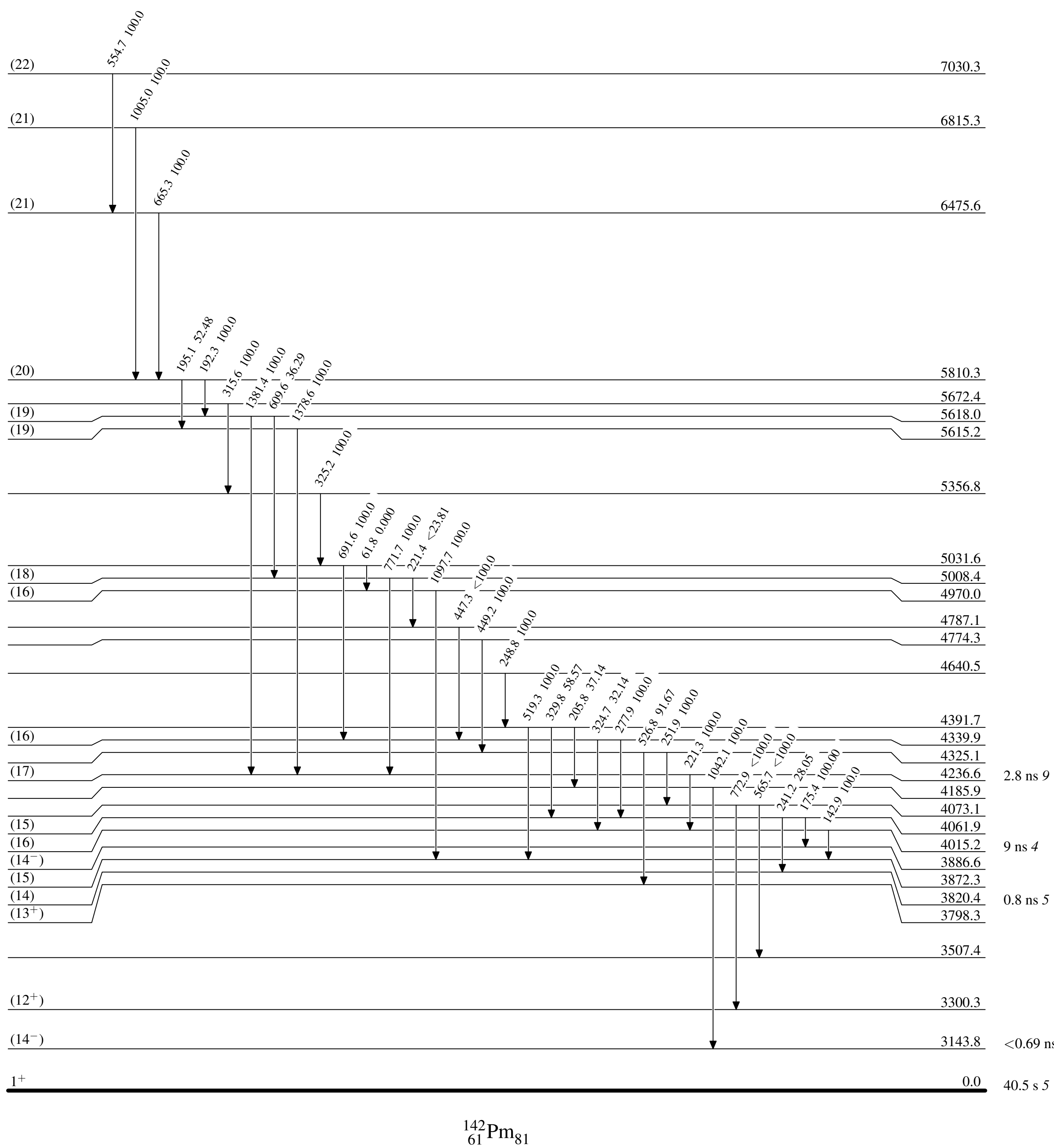
E_i(level)	J_i^π	E_γ‡	I_γ‡	E_f	J_f^π
4073.1		565.7 *9*	<100.0	3507.4	
		772.9 *9*	<100.0	3300.3	(12⁺)
4185.9		1042.1 *6*	100.0	3143.8	(14⁻)
4236.6	(17)	221.3 *3*	100.0	4015.2	(16)
4325.1		251.9 *9*	100.0	4073.1	
		526.8 *9*	91.67	3798.3	(13⁺)
4339.9	(16)	277.9 *6*	100.0	4061.9	(15)
		324.7 *9*	32.14	4015.2	(16)
4391.7		205.8 *9*	37.14	4185.9	
		329.8 *9*	58.57	4061.9	(15)
		519.3 *6*	100.0	3872.3	(15)
4640.5		248.8 *9*	100.0	4391.7	
4774.3		449.2 *9*	100.0	4325.1	
4787.1		447.3 *9*	<100.0	4339.9	(16)
4970.0	(16)	1097.7 *6*	100.0	3872.3	(15)
5008.4	(18)	221.4 *9*	<23.81	4787.1	
		771.7 *9*	100.0	4236.6	(17)
5031.6		61.8 *9*	0.000	4970.0	(16)
		691.6 *9*	100.0	4339.9	(16)
5356.8		325.2 *6*	100.0	5031.6	
5615.2	(19)	1378.6 *6*	100.0	4236.6	(17)
5618.0	(19)	609.6 *9*	36.29	5008.4	(18)
		1381.4 *6*	100.0	4236.6	(17)
5672.4		315.6 *9*	100.0	5356.8	
5810.3	(20)	192.3 *6*	100.0	5618.0	(19)
		195.1 *6*	52.48	5615.2	(19)
6475.6	(21)	665.3 *6*	100.0	5810.3	(20)
6815.3	(21)	1005.0 *6*	100.0	5810.3	(20)
7030.3	(22)	554.7 *9*	100.0	6475.6	(21)

† Additional information 1.
‡ (d,2nγ) (1976Fu07), ΔE=0.1-0.3 keV, ΔIγ=5-30%.
# From ce, γ(θ) in (d,2nγ) or IT decay (1976Fu07).
@ Multiply placed with intensity suitably divided.
& Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

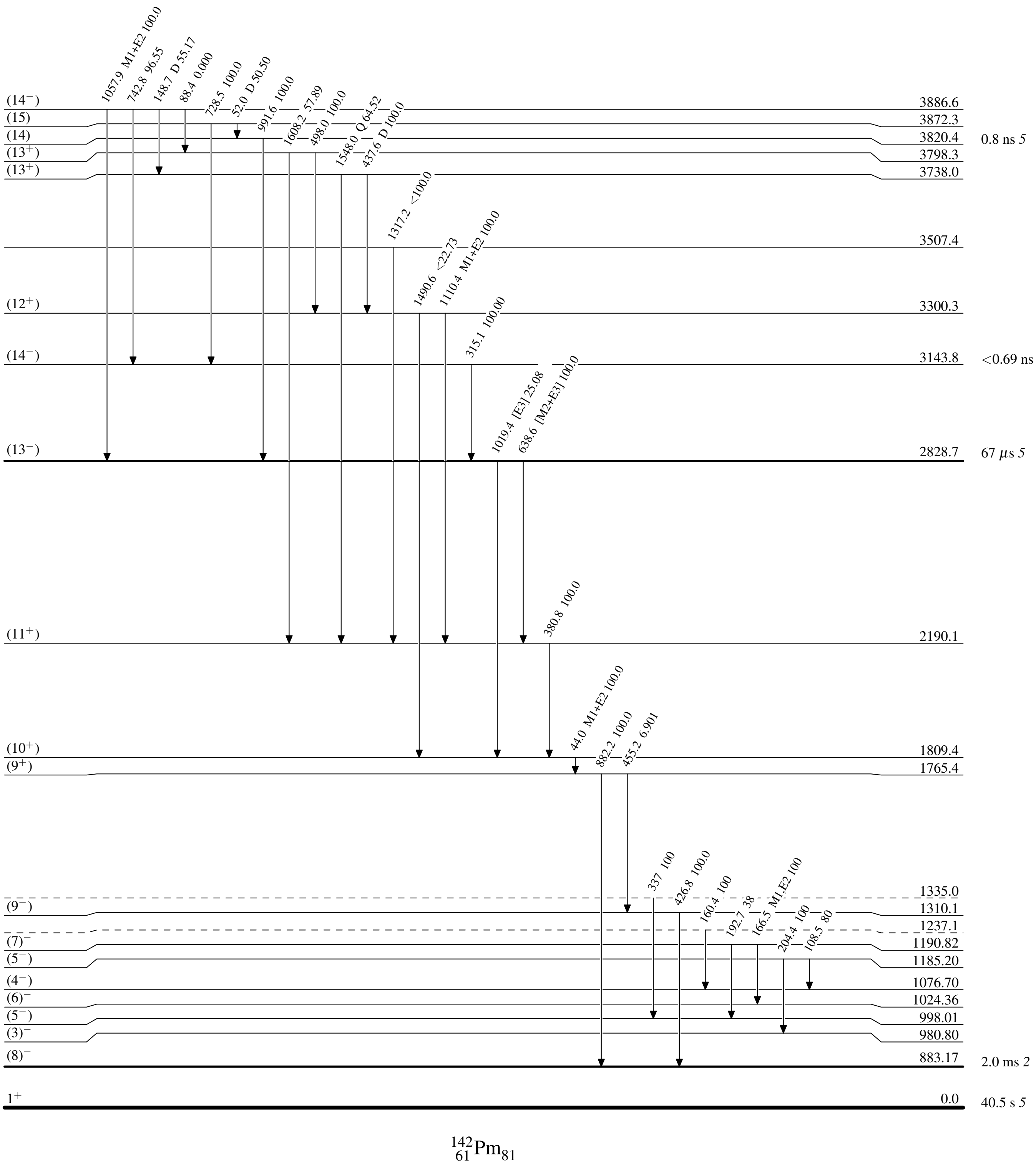
Intensities: Relative photon branching from each level



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
@ Multiply placed: intensity suitably divided