^{142}Nd(d,2nγ) E=13.5 MeV 1976Fu07

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

Measured: γ, $\gamma\gamma$, $\gamma(\theta)$, ce, γ(t).
The level scheme is that of 1976Fu07.

^{142}Pm Levels

E(level)	J$^\pi$ †	$T_{1/2}$	E(level)	J$^\pi$ †	E(level)	J$^\pi$ †
0.0	1^+		618.30 *10*	$(2)^+$	1076.70 *18*	(4^-)
208.52 *8*	$(2)^+$		678.30 *10*	$(2)^-$	1078.30? *16*	(5)
240.98 *8*	$(3)^+$	1.1 ns *3*	706.80 *20*	$(4)^+$	1163.80 *23*	(4^-)
412.01 *12*	$(3)^+$		860.2? *4*		1185.20 *23*	(5^-)
449.47 *13*	$(5)^+$	16.5 ns *15*	883.17 *16*	$(8)^-$	1190.82 *21*	$(7)^-$
460.00 *12*	$(4)^+$		980.80 *15*	$(3)^-$	1237.1? *4*	
496.30 *18*	$(2)^+$		998.01 *16*	(5^-)	1335.0? *11*	
513.12 *13*	$(3)^+$		1024.36 *16*	$(6)^-$		

† Adopted values.

$\gamma(^{142}Pm)$

E_γ ‡	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	α †	$I_{(\gamma+ce)}$	Comments
26.4[a] *3*	<3	1024.36	$(6)^-$	998.01	(5^-)				
32.45 *10*	25.2	240.98	$(3)^+$	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* Mult.: based on $\alpha\approx5.7$ from intensity balance in the ms-delayed spectrum.
(37.5)		449.47	$(5)^+$	412.01	$(3)^+$			≈5	$I_{(\gamma+ce)}$: from observation of 203.5γ in the ms-delayed spectrum.
95.9 *1*	4.2	1076.70	(4^-)	980.80	$(3)^-$				Mult.: $A_2=-0.10$ *8*.
108.5 *2*	≈2	1185.20	(5^-)	1076.70	(4^-)				
160.4 *3*	2.4	1237.1?		1076.70	(4^-)	(M1,E2)	0.418 *13*		α(K)=0.32 *3*; α(L)=0.08 *3*; α(M)=0.017 *7*; α(N+..)=0.0043 *17* α(N)=0.0038 *15*; α(O)=0.00052 *17*; α(P)=1.8×10^{-5} *5* Mult.: ce(K)=0.4 *2*, α(K)exp=0.17 *9*, $A_2=-0.4$ *2*.
166.5 *2*	7.8	1190.82	$(7)^-$	1024.36	$(6)^-$	M1,E2	0.372 *8*	11	ce(K)/(γ+ce)=0.209 *15*; ce(L)/(γ+ce)=0.049 *17*; ce(M)/(γ+ce)=0.011 *4*; ce(N+)/(γ+ce)=0.0027 *10* ce(N)/(γ+ce)=0.0024 *9*; ce(O)/(γ+ce)=0.00033 *10*; ce(P)/(γ+ce)=1.2×10^{-5} *3* Mult.: ce(K)=2.0 *6*, α(K)exp=0.26 *9*, $A_2=+0.3$ *2*.
171.0 *2*	5.3	412.01	$(3)^+$	240.98	$(3)^+$	M1,E2	0.342 *6*	7	ce(K)/(γ+ce)=0.197 *15*; ce(L)/(γ+ce)=0.045 *15*; ce(M)/(γ+ce)=0.010 *4*; ce(N+)/(γ+ce)=0.0025 *9*

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^{142}Nd(d,2nγ) E=13.5 MeV 1976Fu07 (continued)

γ(^{142}Pm) (continued)

E_γ[‡]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[†]	Comments
								ce(N)/(γ+ce)=0.0022 *8*; ce(O)/(γ+ce)=0.00031 *9*; ce(P)/(γ+ce)=1.1×10^{-5} *3* Mult.: ce(K)=0.9 *3*, α(K)exp=0.17 *7*.
192.7 *3*	3.0	1190.82	(7)$^-$	998.01	(5$^-$)			Mult.: A_2=−0.15 *9* (for 192.7γ+193.5γ).
[x]193.5 *3*	6.5							Mult.: α=−0.15 *9* (193.5γ+192.7γ).
203.5 *1*	36.2	412.01	(3)$^+$	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* Mult.: ce(K)=11 *7*, α(K)exp=0.3 *2*.
204.4 *3*	2.5	1185.20	(5$^-$)	980.80	(3)$^-$			
208.5[&] *1*	265[&]	208.52	(2)$^+$	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* E_γ,I_γ: doublet with ΔE=0.15 keV (1975KeZN) and Iγ=385. Mult.: ce(K)<59 *10*, α(K)exp=0.15 *3*, A_2=−0.03 *1*; K/LM=5.83 *16* (1972Ra42).
208.5[&] *1*	120[&]	449.47	(5)$^+$	240.98	(3)$^+$	E2	0.1759	B(E2)(W.u.)=1.62 *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* E_γ,I_γ: doublet with ΔE=0.15 keV (1975KeZN) and Iγ=385. Mult.: ce(K)<59.5, α(K)exp=0.15 *3*; K/LM=2.94 *8* (1972Ra42).
219.0 *1*	65.0	460.00	(4)$^+$	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* α(N)=0.000979 *14*; α(O)=0.0001479 *21*; α(P)=9.41×10^{-6} *14* Mult.: ce(K)=10 *1*, α(K)exp=0.15 *2*, A_2=−0.16 *1*.
241.0 *1*	100	240.98	(3)$^+$	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* Mult.: ce(K)=8 *2*, α(K)exp=0.080 *25*, A_2=+0.12 *1*; K/LM=3.29 *8* (1972Ra42).
246.8 *3*	5.4	706.80	(4)$^+$	460.00	(4)$^+$			Mult.: A_2=+0.21 *10*.
255.4 *3*	7.1	496.30	(2)$^+$	240.98	(3)$^+$			Mult.: A_2=+0.08 *10*.
287.7 *3*	5.8	496.30	(2)$^+$	208.52	(2)$^+$			Mult.: A_2=+0.17 *22*, ce(K)=1.3 *3*, α(K)exp=0.06 *2* (287.7γ+289.4γ).
[x]289.4 *2*	16.5							Mult.: ce(K)=1.3 *3*, α(K)exp=0.06 *2* (for 289.4γ+287.7γ); A_2=−0.12 *10*.
294.8 *3*	3.5	706.80	(4)$^+$	412.01	(3)$^+$	(M1,E2)	0.068 *11*	α(K)=0.056 *11*; α(L)=0.0094 *4*; α(M)=0.00204 *11*; α(N+..)=0.000526 *20* α(N)=0.000456 *20*; α(O)=6.61×10^{-5} *10*; α(P)=3.3×10^{-6} *9* Mult.: A_2=−0.29 *18*; α(K)exp=0.06 *2* (for 294.8γ+289.4γ).
302.5 *1*	22.5	980.80	(3)$^-$	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* Mult.: ce(K)=1.1 *3*, α(K)exp=0.05 *2*, A_2=−0.23 *5*.

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^{142}Nd(d,2nγ) E=13.5 MeV 1976Fu07 (continued)

γ(^{142}Pm) (continued)

E_γ ‡	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult. #	α †	$I_{(\gamma+ce)}$	Comments
304.6 *1*	22.5	513.12	(3)$^+$	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* Mult.: ce(K)=0.9 *3*, α(K)exp=0.04 *2*, A_2=−0.13 *9*.
337	≈2	1335.0?		998.01	(5$^-$)				
377.3 *3*	6.5	618.30	(2)$^+$	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* Mult.: ce(K)=0.3 *1*, α(K)exp=0.045 *15*, A_2=−0.13 *10*.
x384.0 *3*	2.7								
x389.1@ *3*	3.7								
x414.0 *3*	5.5								Mult.: A_2=−0.22 *13*.
x427.1 *2*	10.0								Mult.: ce(K)=(0.3), α(K)exp=(0.03), A_2=−0.51 *20*.
433.7 *1*	60.0	883.17	(8)$^-$	449.47	(5)$^+$	E3	0.0559		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* Mult.: from Iγ and ce(K)=2.5 normalized to α(K)(E3)=0.41; K/LM=2.82 *8* (1972Ra42).
x445.7 *3*	4.4								ce(K)=0.12 *6*, α(K)exp=0.014 *8* (for 445.7γ+448.2γ).
448.2 *3*	4.4	860.2?		412.01	(3)$^+$				Mult.: ce(K)=0.12 *6*, α(K)exp=0.014 *8* (for 448.2γ+445.7γ).
465.8 *3*	5.1	706.80	(4)$^+$	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* Mult.: ce(K)=0.12 *4*, α(K)exp=0.023 *8*, α=−0.17 *10*.
485.5 *2*	7.5	1163.80	(4$^-$)	678.30	(2)$^-$	(E2)	0.01330	7.6	ce(K)/(γ+ce)=0.01080 *15*; ce(L)/(γ+ce)=0.00183 *3*; ce(M)/(γ+ce)=0.000397 *6*; ce(N+)/(γ+ce)=0.0001019 *15* ce(N)/(γ+ce)=8.85×10^{-5} *13*; ce(O)/(γ+ce)=1.277×10^{-5} *18*; ce(P)/(γ+ce)=6.26×10^{-7} *9* Mult.: ce(K)=0.07 *3*, α(K)exp=0.009 *4*, A_2=−0.03 *10*.
496.3 *3*	≈6	496.30	(2)$^+$	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* Mult.: ce(K)=0.14 *4*, α(K)exp=0.025.
538.0 *1*	23.3	998.01	(5$^-$)	460.00	(4)$^+$	(E1)	0.00350 *5*		α=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*;

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^{142}Nd(d,2nγ) E=13.5 MeV 1976Fu07 (continued)

γ(^{142}Pm) (continued)

E_γ ‡	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	α†	Comments
								α(P)=1.727×10^{-7} *25* Mult.: ce(K)=0.12 *5*, α(K)exp=0.005 *2*, A_2=−0.16 *3*.
574.9 *1*	20.2	1024.36	(6)$^-$	449.47	(5)$^+$	E1	0.00302 *5*	α=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*
								Mult.: ce(K)<0.1, α(K)exp<0.005, A_2=−0.24 *3*.
618.3& *1*	≈10&	618.30	(2)$^+$	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*
								E_γ,I_γ: doublet with Iγ=12.6.
								Mult.: ce(K)=0.14 *5*, α(K)exp=0.011 *5*, A_2=−0.01 *7*.
618.3& *1*	≈2&	1078.30?	(5)	460.00	(4)$^+$			E_γ,I_γ: doublet with Iγ=12.6.
678.3 *1*	31.0	678.30	(2)$^-$	0.0	1$^+$	E1	0.00212 *3*	α=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*
								Mult.: ce(K)<0.008, α(K)exp<0.0025, A_2≈−0.1.
^{x}756.8 *2*	7.2							Mult.: A_2=−0.4.
^{x}917.3@ *3*	2.2							
^{x}953.4@ *3*	5.5							

† Additional information 1.
‡ ΔIγ=5-30%; ΔE=0.1-0.3 keV.
# From ce, γ(θ). α(K)exp were normalized to α(K)(E3)=0.041 for 433.7γ.
@ Assignment to ^{142}Pm not certain.
& Multiply placed with intensity suitably divided.
a Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

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Level Scheme

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided

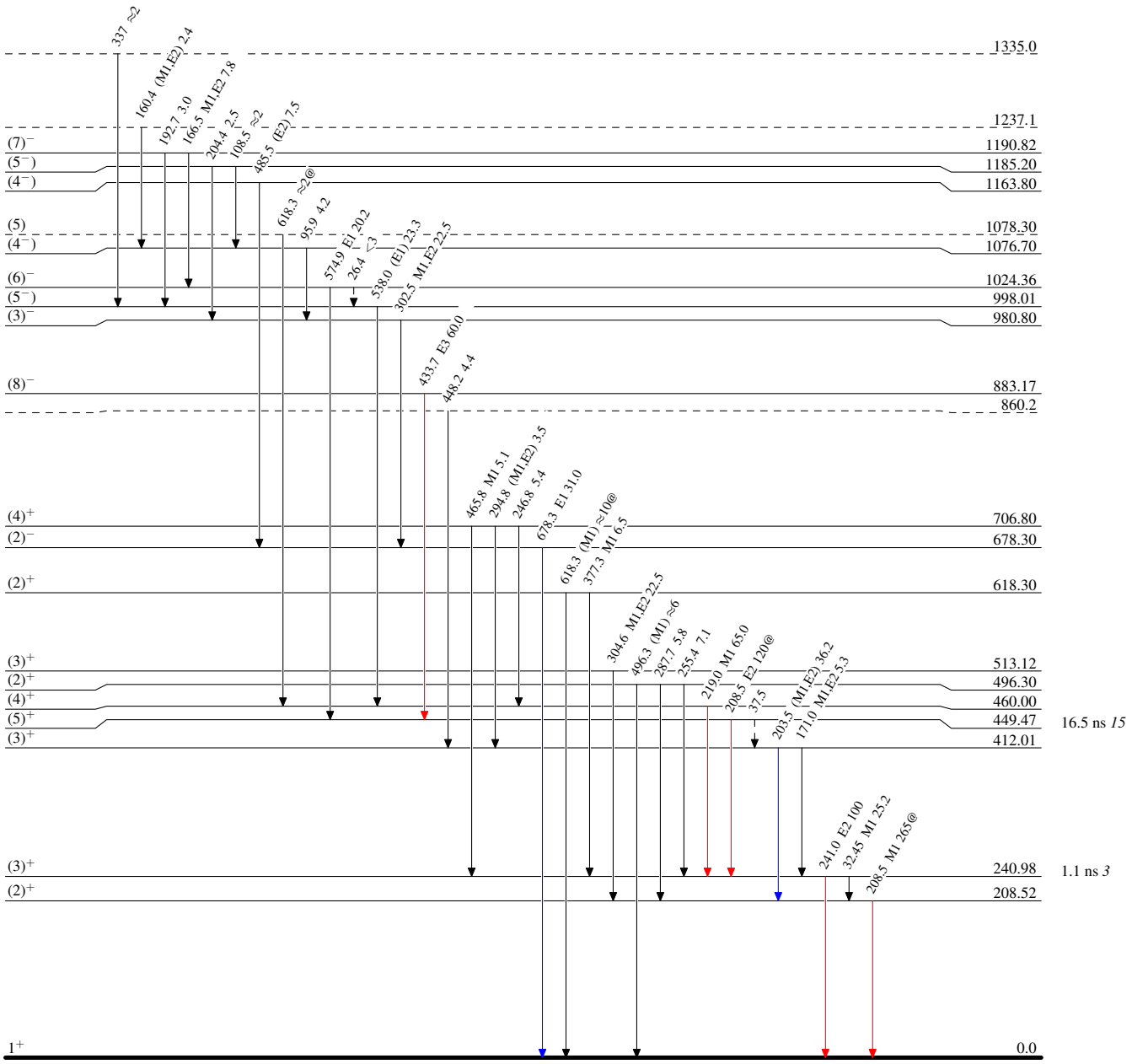
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

γ Decay (Uncertain)



$^{142}_{61}Pm_{81}$