^{146}Nd(p,2nγ) 1980Ko16

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 110, 507 (2009)	1-Oct-2008

Measured: γ, $\gamma\gamma$ and $\gamma\gamma$(t) at E=14.9 MeV, $\gamma(\theta)$ at E=16.8 MeV, ce (at E=14.9 MeV).

^{145}Pm Levels

E(level)	J^{π}†	$T_{1/2}$	E(level)	J^{π}†	E(level)	J^{π}†
0.0	$5/2^+$		883.8 *3*	$7/2^+,5/2^+$	1365.9 *6*	
61.23 *5*	$7/2^+$	2.5 ns *3*	958.0 *4*	$(3/2)^+$	1384.9 *7*	$7/2^-$
492.5 *3*	$3/2^+$		1057.3 *5*	$1/2^+$	1388.5 *8*	
660.5 *5*	$(3/2)^+$		1101.8 *6*	$9/2^-$	1397.2 *7*	$13/2^+$
669.7 *3*	$7/2^+$		1206.8 *6*	$(11/2)^+$	1455.7 *8*	
713.6 *5*	$9/2^+$		1215.2 *5*		1493.6 *8*	$13/2^+$
726.5 *4*	$1/2^+$		1233.9 *5*	$(3/2)^+$	1502.0 *8*	$15/2^+$
750.4 *3*	$9/2^+$		1284.0 *6*	$(7/2,11/2)^-$	1558.3 *8*	
794.6 *4*	$11/2^-$	16.3 ns *15*	1291.9 *6*		1648.7 *9*	(15/2)
823.5 *5*	$5/2^+$		1311.7 *6*			
836.5 *5*	$11/2^+$		1346.9 *6*	$13/2^+$		

† Adopted values.

^{146}Nd(p,2nγ) 1980Ko16 (continued)

$\gamma(^{145}Pm)$

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ	α[†]	Comments
44.2[@]		794.6	$11/2^-$	750.4	$9/2^+$				
61.23 *5*	410 *50*	61.23	$7/2^+$	0.0	$5/2^+$	M1+E2		10 *4*	α(K)=4.6 *9*; α(L)=4 *4*; α(M)=1.0 *9*; α(N+..)=0.25 *21* α(N)=0.22 *19*; α(O)=0.028 *23*; α(P)=0.00026 *10* Mult.: A_2=−0.05 *1*, A_4=−0.03 *2*.
80.76 *5*	35 *5*	750.4	$9/2^+$	669.7	$7/2^+$				
[x]112.10 *5*	8 *2*								
122.80[@] *5*	15 *2*	836.5	$11/2^+$	713.6	$9/2^+$				
[x]146.9 *2*	10 *2*								
153.78 *5*	21 *3*	823.5	$5/2^+$	669.7	$7/2^+$				
155.15[@] *4*	27 *3*	1502.0	$15/2^+$	1346.9	$13/2^+$				
168.04 *5*	63 *5*	660.5	$(3/2)^+$	492.5	$3/2^+$				
190.35 *5*	106 *10*	1397.2	$13/2^+$	1206.8	$(11/2)^+$	M1		0.254	α(K)=0.216 *3*; α(L)=0.0300 *5*; α(M)=0.00639 *9*; α(N+..)=0.001673 *24* α(N)=0.001441 *21*; α(O)=0.000218 *3*; α(P)=1.382×10^{-5} *20* Mult.: A_2=−0.15 *3*, A_4≈0.
223.50 *8*	47 *4*	883.8	$7/2^+$,$5/2^+$	660.5	$(3/2)^+$			0.0047 *11*	α=0.0047 *11*; α(K)=0.0040 *10*; α(L)=0.00055 *11*; α(M)=0.000117 *23*; α(N+..)=3.1×10^{-5} *7* α(N)=2.6×10^{-5} *6*; α(O)=4.0×10^{-6} *9*; α(P)=2.5×10^{-7} *7* Mult.: α(K)exp=0.0037 *10*.
234.00 *6*	80 *10*	726.5	$1/2^+$	492.5	$3/2^+$				
[x]246.5 *1*	20 *4*								
251.48 *7*	105 *10*	1648.7	(15/2)	1397.2	$13/2^+$	D			Mult.: A_2=−0.16 *1*, A_4=+0.09 *1*.
283.17 *7*	43 *4*	1384.9	$7/2^-$	1101.8	$9/2^-$	M1+E2		0.076 *11*	α(K)=0.062 *12*; α(L)=0.0107 *6*; α(M)=0.00233 *17*; α(N+..)=0.00060 *4* α(N)=0.00052 *4*; α(O)=7.50×10^{-5} *17*; α(P)=3.7×10^{-6} *10* Mult.: α(K)exp=0.070 *12*.
307.26 *8*	80 *10*	1101.8	$9/2^-$	794.6	$11/2^-$	M1+E2	0.34 *5*	0.0678 *11*	α(K)=0.0574 *10*; α(L)=0.00817 *12*; α(M)=0.001748 *25*; α(N+..)=0.000456 *7* α(N)=0.000393 *6*; α(O)=5.90×10^{-5} *9*; α(P)=3.62×10^{-6} *7* Mult.: α(K)exp=0.062 *9*; A_2=−0.26 *3*, A_4=−0.12 *5*.
331.00 *8*	190 *15*	823.5	$5/2^+$	492.5	$3/2^+$	M1+(E2)		0.0056 *14*	α(K)=0.040 *9*; α(L)=0.00657 *16*; α(M)=0.001422 *21*; α(N+..)=0.000367 *9* α(N)=0.000318 *6*; α(O)=4.63×10^{-5} *24*; α(P)=2.4×10^{-6} *7* α=0.0056 *14*; α(K)=0.0048 *12*; α(L)=0.00066 *14*; α(M)=0.00014 *3*; α(N+..)=3.7×10^{-5} *8* α(N)=3.2×10^{-5} *7*; α(O)=4.8×10^{-6} *10*; α(P)=3.0×10^{-7} *8* Mult.: α(K)exp=0.056 *7*, K/L=6.8 *6*. Mult.: α(K)exp=0.0056 *12*.
370.3 *4*	26 *7*	1206.8	$(11/2)^+$	836.5	$11/2^+$				
388.1 *4*	28 *7*	1101.8	$9/2^-$	713.6	$9/2^+$				
410.4 *2*	60 *10*	1233.9	$(3/2)^+$	823.5	$5/2^+$	E2+(M1)		0.027 *6*	α(K)=0.023 *6*; α(L)=0.0035 *4*; α(M)=0.00075 *7*; α(N+..)=0.000193 *19*

From ENSDF

$^{145}_{61}Pm_{84}$-2

^{146}Nd(p,2nγ) 1980Ko16 (continued)

γ(^{145}Pm) (continued)

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ	α[†]	Comments
									α(N)=0.000167 *16*; α(O)=2.5×10^{-5} *3*; α(P)=1.4×10^{-6} *4* Mult.: α(K)exp=0.019 *4*.
432.1 *2*	120 *12*	1101.8	9/2$^-$	669.7	7/2$^+$	E1		0.00578 *9*	α=0.00578 *9*; α(K)=0.00495 *7*; α(L)=0.000654 *10*; α(M)=0.0001386 *20*; α(N+..)=3.60×10^{-5} *5* α(N)=3.11×10^{-5} *5*; α(O)=4.64×10^{-6} *7*; α(P)=2.82×10^{-7} *4* Mult.: α(K)exp=0.006 *2*; A_2=−0.11 *6*, A_4≈0.
456.4 *2*	250 *15*	1206.8	(11/2)$^+$	750.4	9/2$^+$	M1+E2	0.07 *1*	0.0250	α(K)=0.0213 *3*; α(L)=0.00289 *4*; α(M)=0.000614 *9*; α(N+..)=0.0001608 *23* α(N)=0.0001385 *20*; α(O)=2.10×10^{-5} *3*; α(P)=1.347×10^{-6} *19* Mult.: α(K)exp=0.025 *4*; A_2=−0.07 *2*, A_4≈0.
465.5 *4*	35 *8*	958.0	(3/2)$^+$	492.5	3/2$^+$			0.0033 *8*	α=0.0033 *8*; α(K)=0.0028 *7*; α(L)=0.00038 *8*; α(M)=8.1×10^{-5} *16*; α(N+..)=2.1×10^{-5} *5* α(N)=1.8×10^{-5} *4*; α(O)=2.8×10^{-6} *6*; α(P)=1.7×10^{-7} *5* Mult.: α(K)exp=0.0030 *10*; A_2=−0.06 *3*, A_4=+0.06 *4*.
468.4 *3*	35 *8*	1291.9		823.5	5/2$^+$				
492.5 *3*	1000	492.5	3/2$^+$	0.0	5/2$^+$	M1(+E2)		0.017 *4*	α(K)=0.014 *4*; α(L)=0.0021 *3*; α(M)=0.00045 *6*; α(N+..)=0.000116 *17* α(N)=0.000100 *15*; α(O)=1.48×10^{-5} *25*; α(P)=9.E−7 *3* Mult.: α(K)exp=0.017 *2*, K/L=6.2; A_2=−0.004 *9*, A_4=0.0.
493.2 *5*	45 *7*	1206.8	(11/2)$^+$	713.6	9/2$^+$				
510.4 *4*	90 *15*	1346.9	13/2$^+$	836.5	11/2$^+$	(M1+E2)		0.015 *4*	α(K)=0.013 *4*; α(L)=0.0019 *3*; α(M)=0.00040 *6*; α(N+..)=0.000105 *16* α(N)=9.1×10^{-5} *14*; α(O)=1.35×10^{-5} *23*; α(P)=7.9×10^{-7} *23* Mult.: α(K)exp=0.017 *4*.
529.4 *3*	42 *5*	1365.9		836.5	11/2$^+$				
537.0 *4*	50 *7*	1206.8	(11/2)$^+$	669.7	7/2$^+$				
545.5 *4*	21 *5*	1215.2		669.7	7/2$^+$				
564.8 *3*	134 *14*	1057.3	1/2$^+$	492.5	3/2$^+$	M1+E2		0.012 *3*	α(K)=0.010 *3*; α(L)=0.00143 *25*; α(M)=0.00031 *5*; α(N+..)=8.0×10^{-5} *14* α(N)=6.9×10^{-5} *12*; α(O)=1.03×10^{-5} *20*; α(P)=6.1×10^{-7} *18* Mult.: α(K)exp=0.011 *2*; A_2=−0.06 *6*, A_4=+0.09 *9*.
570.4 *3*	180 *15*	1284.0	(7/2,11/2)$^-$	713.6	9/2$^+$	E1		0.00307 *5*	α=0.00307 *5*; α(K)=0.00264 *4*; α(L)=0.000344 *5*; α(M)=7.29×10^{-5} *11*; α(N+..)=1.90×10^{-5} *3* α(N)=1.636×10^{-5} *23*; α(O)=2.45×10^{-6} *4*; α(P)=1.522×10^{-7} *22* Mult.: α(K)exp=0.003 *1*; A_2=−0.09 *8*, A_4≈0.
599.1 *5*	660 *50*	660.5	(3/2)$^+$	61.23	7/2$^+$	(E2)		0.0080 *20*	α=0.00769 *11*; α(K)=0.00641 *9*; α(L)=0.001007 *15*; α(M)=0.000217 *3*; α(N+..)=5.60×10^{-5} *8* α(N)=4.86×10^{-5} *7*; α(O)=7.10×10^{-6} *10*; α(P)=3.77×10^{-7} *6* α=0.0080 *20*; α(K)=0.0068 *18*; α(L)=0.00095 *19*; α(M)=0.00020 *4*; α(N+..)=5.3×10^{-5} *10* α(N)=4.6×10^{-5} *9*; α(O)=6.8×10^{-6} *14*; α(P)=4.2×10^{-7} *12* Mult.: α(K)exp=0.0079 *15*. Mult.: A_2=−0.19 *5*, A_4≈0.

From ENSDF

$^{145}_{61}Pm_{84}$-3

^{146}Nd(p,2nγ) 1980Ko16 (continued)

γ(^{145}Pm) (continued)

E_γ	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ	α[†]	Comments
608.6 *4*	180 *15*	669.7	7/2$^+$	61.23	7/2$^+$				
[x]616.4 *4*	260 *20*					E1		0.00260 *4*	α=0.00260 *4*; α(K)=0.00223 *4*; α(L)=0.000290 *4*; α(M)=6.14×10^{-5} *9*; α(N+..)=1.598×10^{-5} *23* α(N)=1.378×10^{-5} *20*; α(O)=2.07×10^{-6} *3*; α(P)=1.290×10^{-7} *19* Mult.: α(K)exp=0.0038 *12*; A_2=−0.04 *2*, A_4≈0.
622.3 *4*	50 *7*	1291.9		669.7	7/2$^+$				
633.3 *3*	120 *15*	1346.9	13/2$^+$	713.6	9/2$^+$	E2		0.00669 *10*	α=0.00669 *10*; α(K)=0.00560 *8*; α(L)=0.000865 *13*; α(M)=0.000186 *3*; α(N+..)=4.81×10^{-5} *7* α(N)=4.17×10^{-5} *6*; α(O)=6.11×10^{-6} *9*; α(P)=3.31×10^{-7} *5* Mult.: α(K)exp=0.004 *2*; A_2=+0.23 *3*, A_4=+0.03 *5*.
646.8 *4*	130 *15*	1397.2	13/2$^+$	750.4	9/2$^+$	E2		0.00636 *9*	α=0.00636 *9*; α(K)=0.00532 *8*; α(L)=0.000817 *12*; α(M)=0.0001759 *25*; α(N+..)=4.54×10^{-5} *7* α(N)=3.94×10^{-5} *6*; α(O)=5.78×10^{-6} *9*; α(P)=3.15×10^{-7} *5* Mult.: A_2=+0.18 *6*, A_4=−0.05 *8*.
652.4 *4*	1.8×10^3 *1*	713.6	9/2$^+$	61.23	7/2$^+$	M1+E2	0.63 *3*	0.00909 *15*	α=0.00909 *15*; α(K)=0.00774 *13*; α(L)=0.001064 *17*; α(M)=0.000227 *4*; α(N+..)=5.92×10^{-5} *10* α(N)=5.10×10^{-5} *8*; α(O)=7.68×10^{-6} *13*; α(P)=4.81×10^{-7} *9* Mult.: α(K)exp=0.0046 *15*, K/L=7.6 *5*; A_2=+0.25 *1*, A_4=+0.00 *1*.
652.4 *4*	95 *15*	1365.9		713.6	9/2$^+$				
657.1 *5*	105 *10*	1493.6	13/2$^+$	836.5	11/2$^+$	M1		0.01005	α(K)=0.00860 *13*; α(L)=0.001148 *17*; α(M)=0.000244 *4*; α(N+..)=6.39×10^{-5} *9* α(N)=5.50×10^{-5} *8*; α(O)=8.34×10^{-6} *12*; α(P)=5.40×10^{-7} *8* Mult.: A_2=−0.29 *6*, A_4=+0.08 *9*.
665.5 *4*	240 *20*	1502.0	15/2$^+$	836.5	11/2$^+$	E2		0.00593 *9*	α=0.00593 *9*; α(K)=0.00497 *7*; α(L)=0.000757 *11*; α(M)=0.0001629 *23*; α(N+..)=4.21×10^{-5} *6* α(N)=3.65×10^{-5} *6*; α(O)=5.36×10^{-6} *8*; α(P)=2.94×10^{-7} *5* Mult.: A_2=+0.26 *4*, A_4≈0.
669.7 *3*	940 *50*	669.7	7/2$^+$	0.0	5/2$^+$	M1+E2	0.44 *7*	0.00899 *21*	α=0.00899 *21*; α(K)=0.00767 *19*; α(L)=0.001039 *22*; α(M)=0.000221 *5*; α(N+..)=5.78×10^{-5} *12* α(N)=4.98×10^{-5} *11*; α(O)=7.52×10^{-6} *16*; α(P)=4.79×10^{-7} *12* Mult.: α(K)exp=0.008 *1*, K/L=6.8 *8*; A_2=+0.13 *1*, A_4=−0.00 *2*.
674.9 *5*	40 *10*	1388.5		713.6	9/2$^+$				
[x]711.1 *4*	140 *15*								
721.8 *5*	50 *10*	1558.3		836.5	11/2$^+$				
733.4 *3*	520 *50*	794.6	11/2$^-$	61.23	7/2$^+$	M2		0.0211	B(M2)(W.u.)=0.30 *5* α(K)=0.0178 *3*; α(L)=0.00259 *4*; α(M)=0.000557 *8*; α(N+..)=0.0001459 *21* α(N)=0.0001257 *18*; α(O)=1.90×10^{-5} *3*; α(P)=1.196×10^{-6} *17* Mult.: α(K)exp=0.020 *3*; A_2=+0.06 *3*, A_4≈0.
742.1 *5*	50 *10*	1455.7		713.6	9/2$^+$				
750.4 *3*	1540 *80*	750.4	9/2$^+$	0.0	5/2$^+$	E2		0.00446 *7*	α=0.00446 *7*; α(K)=0.00376 *6*; α(L)=0.000555 *8*; α(M)=0.0001190

From ENSDF

$^{145}_{61}Pm_{84}$-4

^{146}Nd(p,2nγ) 1980Ko16 (continued)

γ(^{145}Pm) (continued)

E_γ	I_γ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	δ	α†	Comments
									17; α(N+..)=3.08×10^{-5} *5* α(N)=2.67×10^{-5} *4*; α(O)=3.94×10^{-6} *6*; α(P)=2.24×10^{-7} *4* Mult.: α(K)=0.00376 used for normalization of other α(K)exp, K/L=6.2 *12*; A_2=+0.134 *4*, A_4=−0.022 *5*.
775.3 *3*	1250 *60*	836.5	11/2$^+$	61.23	7/2$^+$	E2		0.00414 *6*	α=0.00414 *6*; α(K)=0.00349 *5*; α(L)=0.000511 *8*; α(M)=0.0001096 *16*; α(N+..)=2.84×10^{-5} *4* α(N)=2.46×10^{-5} *4*; α(O)=3.63×10^{-6} *6*; α(P)=2.08×10^{-7} *3* Mult.: α(K)exp=0.0045 *10*; A_2=+0.18 *1*, A_4=−0.06 *1*.
794.6 *5*	25 *10*	794.6	11/2$^-$	0.0	5/2$^+$	E3		0.00903 *13*	α=0.00903 *13*; α(K)=0.00735 *11*; α(L)=0.001323 *19*; α(M)=0.000289 *4*; α(N+..)=7.45×10^{-5} *11* α(N)=6.47×10^{-5} *10*; α(O)=9.37×10^{-6} *14*; α(P)=4.60×10^{-7} *7* B(E3)(W.u.)=13 *6*
799.4 *5*	40 *8*	1291.9		492.5	3/2$^+$				
819.2 *5*	120 *15*	1311.7		492.5	3/2$^+$				
883.8 *3*	250 *30*	883.8	7/2$^+$,5/2$^+$	0.0	5/2$^+$	E2+M1	1.1 *4*	0.0039 *4*	α=0.0039 *4*; α(K)=0.0033 *4*; α(L)=0.00045 *4*; α(M)=9.7×10^{-5} *9*; α(N+..)=2.53×10^{-5} *23* α(N)=2.18×10^{-5} *20*; α(O)=3.3×10^{-6} *3*; α(P)=2.04×10^{-7} *24* Mult.: α(K)exp=0.0038 *10*, A_2=+0.31 *3*, A_4=−0.05 *5*.
1040.7 *5*	140 *15*	1101.8	9/2$^-$	61.23	7/2$^+$				
1154.1 *5*	42 *8*	1215.2		61.23	7/2$^+$				
1215.2 *5*	150 *15*	1215.2		0.0	5/2$^+$				
x1224.7 *5*	90 *15*								
x1228.8 *5*	140 *20*								
1233.6 *5*	115 *15*	1233.9	(3/2)$^+$	0.0	5/2$^+$				
x1244.4 *5*	155 *20*								
x1300.8 *5*	160 *20*								
1311.7 *6*	65 *10*	1311.7		0.0	5/2$^+$				

† Additional information 1.
‡ Measured at E(p)=15.8 MeV.
# α(K)exp were normalized to α(K)(E2) for 750.4γ.
@ Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

From ENSDF

$^{145}_{61}Pm_{84}$-5

^{146}Nd(p,2nγ) 1980Ko16

Level Scheme

Intensities: Relative I_γ

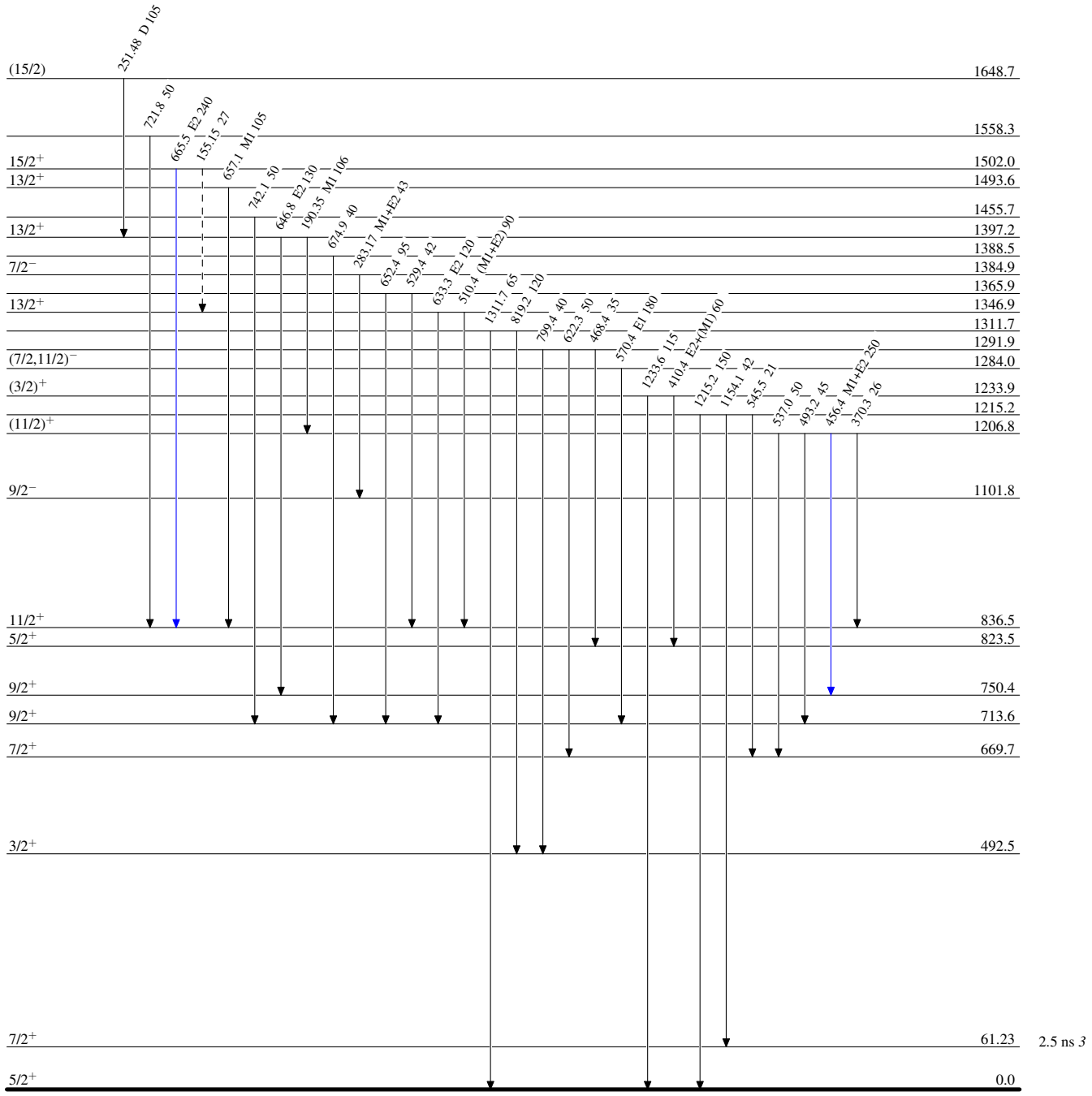
Legend

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

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

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

γ Decay (Uncertain)



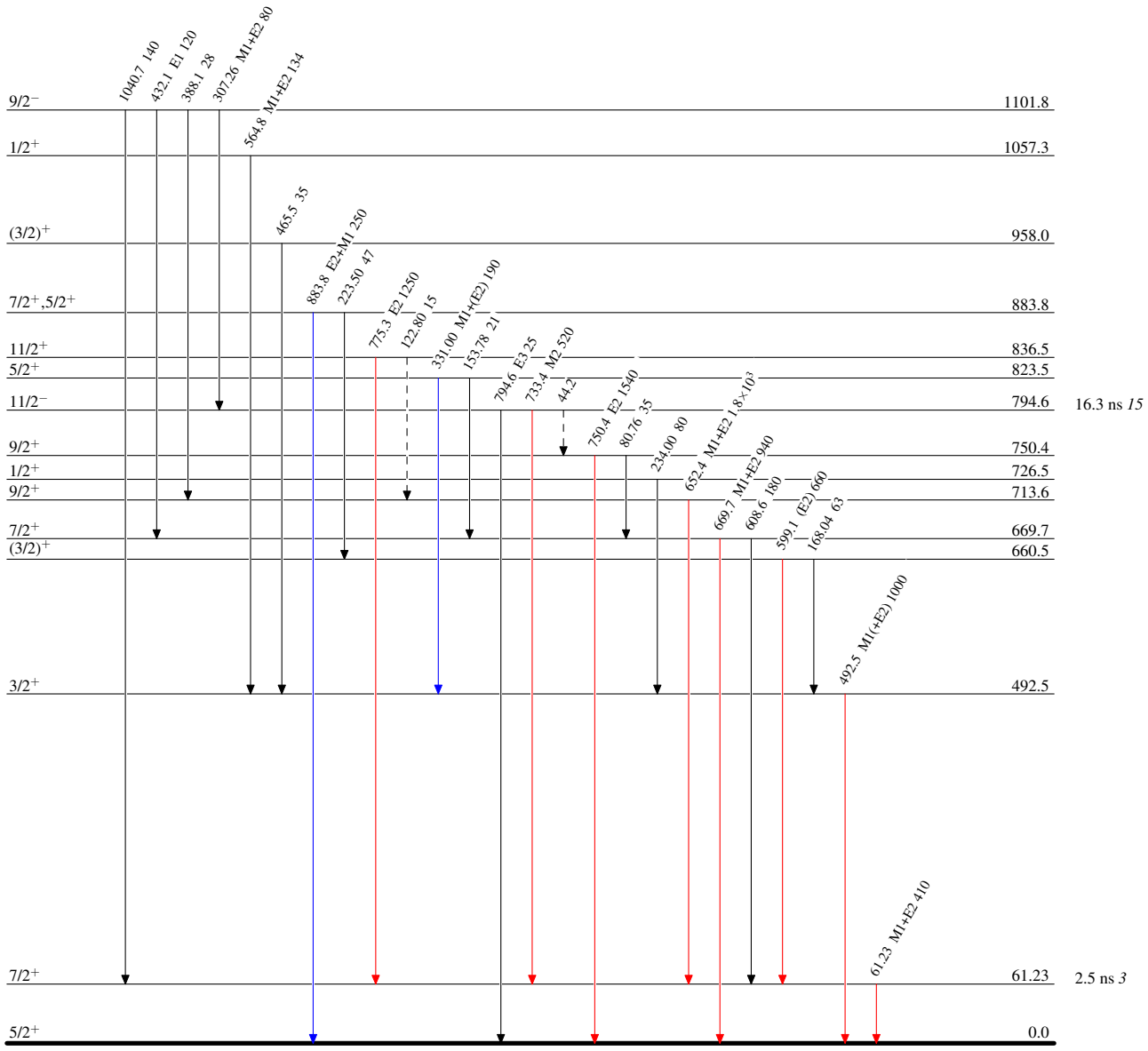
$^{145}_{61}Pm_{84}$

^{146}**Nd(p,2nγ) 1980Ko16**

Level Scheme (continued)

Intensities: Relative I_γ

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)



$^{145}_{61}Pm_{84}$