^{150}Nd(^{7}Li,5nγ) 1981Pi07

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

E=35-50 MeV; measured: γ, $\gamma\gamma$, $\gamma(\theta)$, γ(t), excit.

^{152}Eu Levels

1981Pi07 suggest that the levels at 211.62 and 219.48 have also been seen by 1978Vo05 in the (n,γ) E=th work. 1978Vo05 do find that from energy combinations there is a possibility of a level at 211.616. However, four of the five transitions which produce this level are already placed elsewhere in the level scheme. In addition 1978Vo05 suggest that this level would have $J^{\pi}=4^{-}$, not 6^{-} as proposed by 1981Pi07. If the γ's assigned to this level by 1981Pi07 did deexcite a level at 211.62, then >2.3% of the total (n,γ) capture decay from 3^{+} capturing state would go through this level. The 219.48 level has an assigned $J^{\pi}=7^{-}$ and is deexcited by a single measured γ. Although 1978Vo05 see a γ of similar energy, it does not necessarily follow that this is the same γ as seen by 1981Pi07 (1978Vo05 observe >2500 γ's with Eγ<600 keV).

E(level)[†]	J^{π}[‡]	$T_{1/2}$	Comments
0.0	3^{-}		
77.26	3^{-}		
89.85	4^{+}		J^{π}: J=4 from excit.
108.11	5^{+}		
141.83	4^{-}		
147.8[#]	8^{-}		
148.74	6^{+}		
150.69	4^{-}		J^{π}: J=4 from excit.
180.63	5^{-}		J^{π}: J=5 from excit.
211.62	6		J^{π}: J=6 from excit.
219.48	7		J^{π}: J=7 from excit.
286.48[@]	9^{-}	3.5 ns *15*	J^{π}: J=9 from excit.
306.7[#]	9^{-}		
424.4[@]	10^{-}		
447.8[@]	11^{-}		
495.8[#]	10^{-}		
625.7[@]	12^{-}		
711.7[#]	11^{-}		
758.8[@]	13^{-}		
950.2[#]	12^{-}		
954.0[@]	14^{-}		
1206.4[@]	15^{-}		J^{π}: J=15 from excit (447.4γ).
1208.5[#]	13^{-}		
1406.7[@]	16^{-}		
1485.1[#]	14^{-}		
1760.6[@]	17^{-}		
1775.6[#]	15^{-}		
1958.7[@]	18^{-}		
2080[#]	16^{-}		
2401.6[@]	19^{-}		J^{π}: J=19 from excit.
2592.3[@]	20^{-}		

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^{150}Nd(^{7}Li,5nγ) 1981Pi07 (continued)

^{152}Eu Levels (continued)

† From 1981Pi07.
‡ From Adopted Levels. Arguments from this reaction, based on excitation functions, are given in the comments.
# Band(A): (π 5/2[413])(ν 11/2[505]).
@ Band(B): (π 1h$_{11/2}$)(ν 1i$_{13/2}$).

γ(^{152}Eu)

E_γ	I_γ†	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	δ	Comments
18.25 *3*	31 *9*	108.11	5^+	89.85	4^+	M1+E2#	0.04# *1*	
23.43 *3*	32 *5*	447.8	11^-	424.4	10^-	D		Mult.: A_2=−0.20 *24*: ΔJ≠2.
≈40.6	≈117	148.74	6^+	108.11	5^+			
51.98 *2*	19 *2*	141.83	4^-	89.85	4^+	E1#		Mult.: A_2=+0.19 *3*.
62.86 *2*	28 *3*	211.62	6	148.74	6^+	D,Q		Mult.: A_2=+0.31 *7*, A_4=+0.04 *12*: ΔJ=0, D or ΔJ=2 Q.
67.01 *2*	70 *7*	286.48	9^-	219.48	7	E2		Mult.: A_2=+0.237 *21*, A_4=−0.04 *4*: ΔJ=2, Q or ΔJ=0 D.
70.70 *2*	189 *19*	219.48	7	148.74	6^+	D		Mult.: A_2=−0.14 *4*, A_4=−0.01 *6*: ΔJ=1.
72.52 *2*	51 *6*	180.63	5^-	108.11	5^+	E1#		Mult.: A_2=+0.28 *8*, A_4=−0.05 *15*: ΔJ=0 D or ΔJ=2 Q.
73.43 *2*	31 *4*	150.69	4^-	77.26	3^-	M1+E2#	0.18# *1*	Mult.: A_2=−0.08 *18*.
77.26 *3*	56 *9*	77.26	3^-	0.0	3^-	M1+E2#	0.10# *3*	Mult.: A_2=−0.03 *27*.
x85.43 *5*	108 *22*							
89.85 *2*	1000	89.85	4^+	0.0	3^-	E1#		A_2=−0.016 *10*, A_4=+0.005 *15*: ΔJ=1 D+Q.
90.8 *1*	25 *5*	180.63	5^-	89.85	4^+	E1#		
103.50 *2*	127 *13*	211.62	6	108.11	5^+	D		Mult.: A_2=−0.13 *3*, A_4=+0.01 *4*: ΔJ=1.
133.10 *2*	102 *10*	758.8	13^-	625.7	12^-	D+Q		Mult.: A_2=−0.02 *7*, A_4=−0.09 *11*.
137.89 *2*	310 *32*	424.4	10^-	286.48	9^-	D+Q		Mult.: A_2=−0.04 *5*, A_4=+0.04 *8*: ΔJ=1, D+Q.
158.86 *5*	57 *6*	306.7	9^-	147.8	8^-	M1+E2	−0.30 *+9−14*	Mult.: A_2=−0.70 *7*, A_4=+0.10 *8*: ΔJ=1, D+Q.
161.32 *2*	268 *27*	447.8	11^-	286.48	9^-	E2		Mult.: A_2=+0.30 *8*, A_4=−0.03 *3*: ΔJ=2, Q or ΔJ=0, D.
177.96 *3*	253 *26*	625.7	12^-	447.8	11^-	D		Mult.: A_2=−0.10 *7*, A_4=+0.02 *11*: ΔJ=1, D+Q.
189.08 *5*	59 *6*	495.8	10^-	306.7	9^-	M1+E2	−0.34 *10*	Mult.: A_2=−0.67 *7*, A_4=+0.12 *8*: ΔJ=1, D+Q.
195.19 *5*	196 *20*	954.0	14^-	758.8	13^-	D+Q		Mult.: A_2=−0.166 *20*, A_4=−0.04 *3*.
198.20 *10*	29 *6*	1958.7	18^-	1760.6	17^-			
200.31 *2*	87 *9*	1406.7	16^-	1206.4	15^-	D		Mult.: A_2=−0.23 *11*, A_4=+0.04 *15*: ΔJ=1, D.
215.94 *12*	53 *6*	711.7	11^-	495.8	10^-	M1+E2	−0.4 *+3−4*	Mult.: A_2=−0.8 *4*, A_4=+0.1 *5*: ΔJ=1, D+Q.
238.48 *6*	44 *17*	950.2	12^-	711.7	11^-	M1+E2	−0.8 *+3−11*	
252.5 *3*	22 *8*	1206.4	15^-	954.0	14^-			
258.25 *10*	21 *9*	1208.5	13^-	950.2	12^-	M1+E2	0.52 *18*	δ: from branching and rotational model.
276.5 *3*	6 *3*	1485.1	14^-	1208.5	13^-			
290.5 *3*	10 *5*	1775.6	15^-	1485.1	14^-			
304.5 *5*	5 *3*	2080	16^-	1775.6	15^-			
311.0 *1*	428 *43*	758.8	13^-	447.8	11^-	E2		Mult.: A_2=+0.29 *8*, A_4=−0.05 *14*: ΔJ=2, Q or ΔJ=0, D.
328.5 *3*	104 *15*	954.0	14^-	625.7	12^-	E2		Mult.: A_2=+0.31 *8*, A_4=−0.04 *15*: ΔJ=2, Q or ΔJ=0, D.
348.0 *2*	24 *5*	495.8	10^-	147.8	8^-			
404.8 *2*	23 *5*	711.7	11^-	306.7	9^-			
447.4 *1*	350 *35*	1206.4	15^-	758.8	13^-	E2		Mult.: A_2=+0.28 *10*: ΔJ=2, Q or ΔJ=0, D.
452.5 *2*	138 *27*	1406.7	16^-	954.0	14^-	E2		Mult.: A_2=+0.24 *15*: ΔJ=2, Q or ΔJ=0, D.
454.4 *3*	36 *6*	950.2	12^-	495.8	10^-			
497.1 *3*	41 *18*	1208.5	13^-	711.7	11^-			

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^{150}Nd(^{7}Li,5nγ) 1981Pi07 (continued)

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

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
534.9 *3*	39 *12*	1485.1	14^-	950.2	12^-		
552.0 *3*	154 *23*	1958.7	18^-	1406.7	16^-	E2	Mult.: A_2=+0.46 *20*: ΔJ=2, Q or ΔJ=0, D.
554.2 *3*	214 *32*	1760.6	17^-	1206.4	15^-	E2	Mult.: A_2=+0.45 *20*: ΔJ=2, Q or ΔJ=0, D.
567.0 *5*	40 *12*	1775.6	15^-	1208.5	13^-		
594.5 *5*	20 *8*	2080	16^-	1485.1	14^-		
633.6 *3*	84 *13*	2592.3	20^-	1958.7	18^-	E2	Mult.: A_2=+0.27 *10*: ΔJ=2, Q or ΔJ=0, D.
641.1 *3*	89 *13*	2401.6	19^-	1760.6	17^-	E2	Mult.: A_2=+0.21 *10*: ΔJ=2, Q or ΔJ=0, D.

† At E(^{7}Li)=48 MeV.

‡ Deduced from $\gamma(\theta)$; crossover transitions, which from A_2 are either ΔJ=2, Q or ΔJ=0, D. Q′s are assumed to be E2; cascading D+Q transitions with measurable δ are assumed to be M1+E2.

From adopted gammas.

x γ ray not placed in level scheme.

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Level Scheme

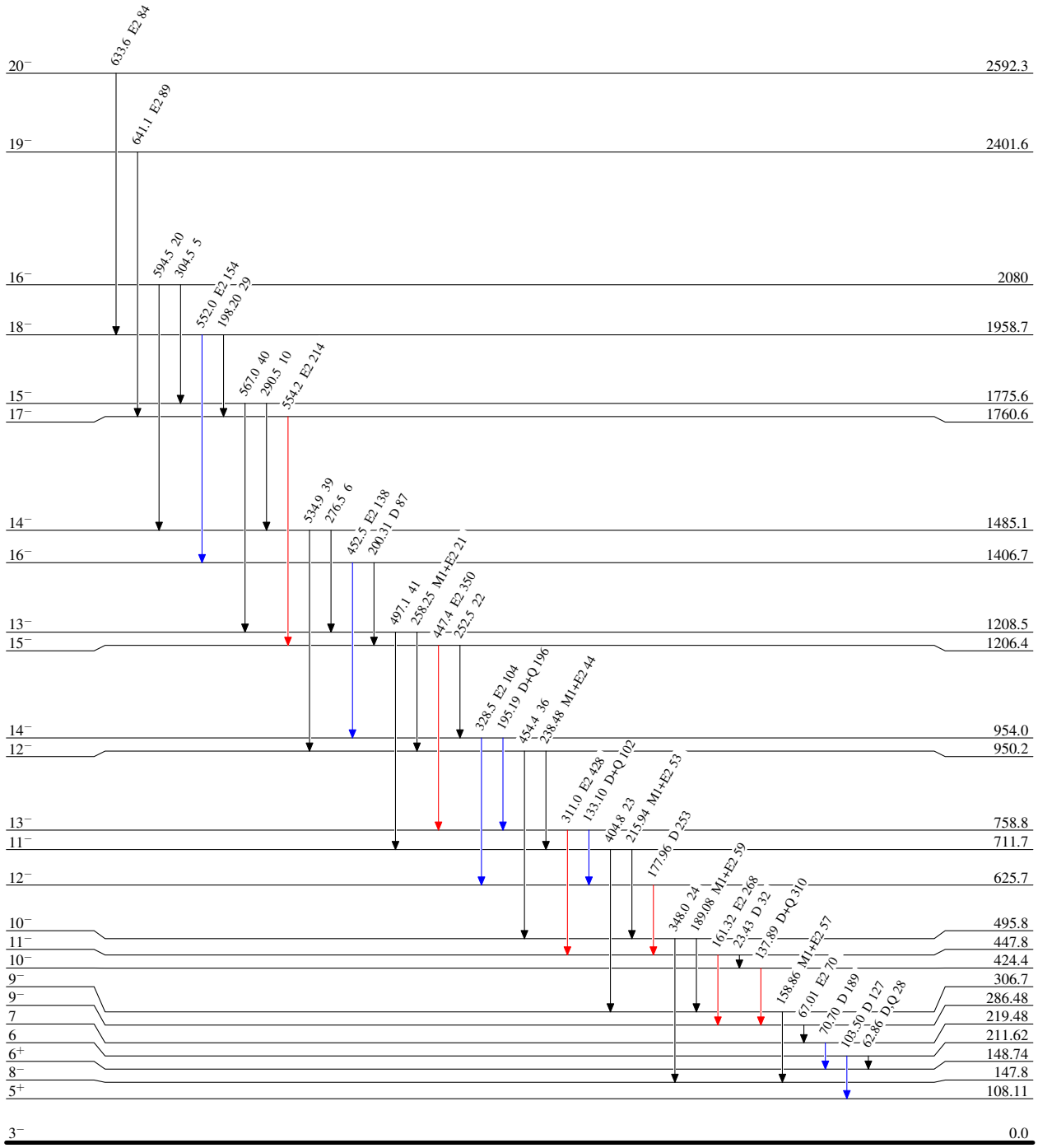
Intensities: Relative I_γ

Legend

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

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

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

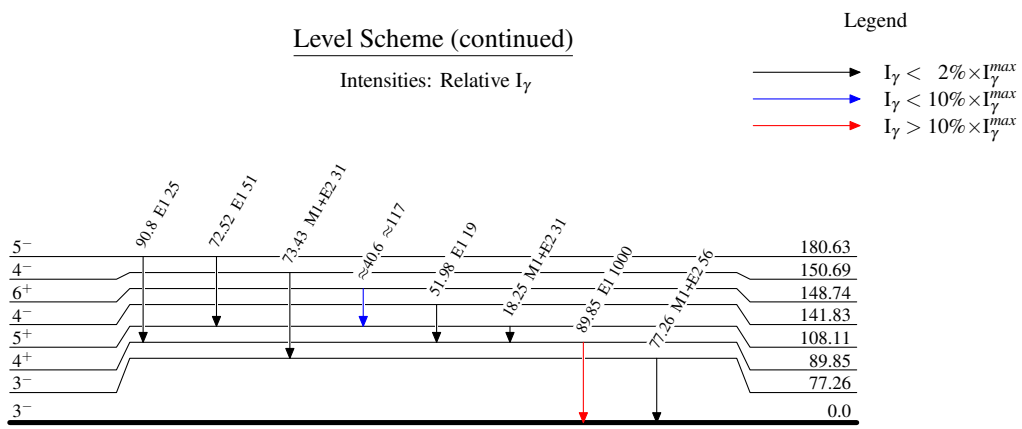


$^{152}_{63}Eu_{89}$

^{150}Nd(^{7}Li,5nγ) 1981Pi07

Level Scheme (continued)

Intensities: Relative I_γ



$^{152}_{63}Eu_{89}$

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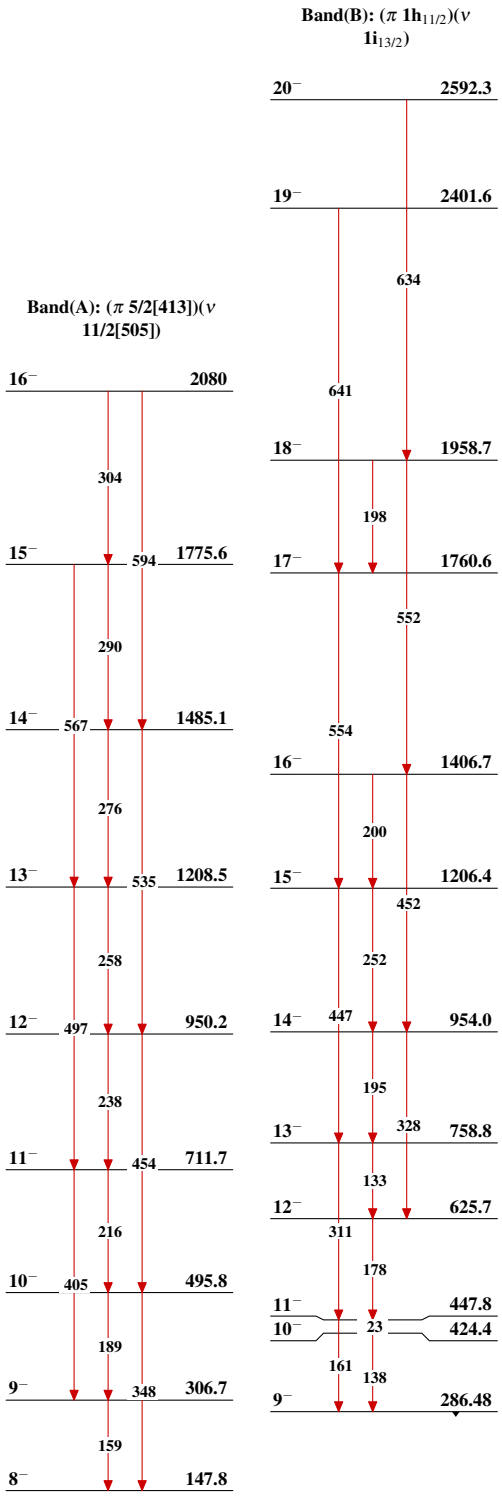

$^{152}_{63}Eu_{89}$