^{145}Nd(^{7}Li,3nγ),^{146}Nd(^{6}Li,3nγ) 1977Fl09

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 185, 2 (2022)	23-Aug-2022

1977Fl09 (also thesis by 1977FlZP): E=26.0-34.0 MeV beams from the Notre Dame FN tandem. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma(\theta)$, excitation functions.

Level scheme is from 1977Fl09, which is the same as in the Adopted Levels, mostly taken from 1994Ur01 in ^{139}La(^{13}C,3nγ) for high-spin section, except for placements of some transitions as noted under comments.

^{149}Eu Levels

E(level)[†]	J$^{\pi}$[‡]	Comments
0.0	5/2$^+$	
149.3 *3*	7/2$^+$	
495.6 *5*	11/2$^-$	
665.5 *5*	9/2$^+$	
793.8 *6*	9/2$^-$	
909.8 *5*	7/2$^+$	J$^{\pi}$: 11/2$^+$ in the Adopted Levels.
993.7 *6*	15/2$^-$	
1059		J$^{\pi}$: (9/2$^-$,11/2,13/2$^-$) in the Adopted Levels.
1527.4 *6*	(13/2,17/2)$^-$	J$^{\pi}$: (15/2)$^+$ in the Adopted Levels.
1608.6 *6*	19/2$^-$	
1657.6 *6*	9/2$^+$	J$^{\pi}$: (15/2$^+$) in the Adopted Levels.
1997.3 *6*	(17/2,21/2)$^-$	J$^{\pi}$: (19/2)$^+$ in the Adopted Levels.
2333.7 *7*	23/2$^-$	
2340.8 *7*	(17/2$^+$,21/2$^+$)	J$^{\pi}$: (21/2)$^+$ in the Adopted Levels.
2495.4 *7*	(23/2$^-$)	J$^{\pi}$: from Fig. 6 in 1977Fl09. However, 15/2$^-$ and 19/2$^-$ possibilities are also listed in authors' Table II. J^{π}=(23/2$^-$) in the Adopted Levels.
2559.9 *7*	(21/2,25/2)$^-$	J$^{\pi}$: (23/2)$^+$ in the Adopted Levels.
2574.4 *7*	(25/2$^+$)	J$^{\pi}$: (25/2)$^-$ in the Adopted Levels.
2749.3 *8*	(27/2$^-$)	
2982.1? *8*		E(level): corresponds to 1744, (15/2)$^+$ level in the Adopted Levels.
3042.0? *9*	(29/2$^+$)	E(level): corresponds to 3543, (31/2)$^+$ level in the Adopted Levels.

[†] From a least-squares fit to γ-ray energies.

[‡] From 1977Fl09, based on measured $\gamma(\theta)$ and known assignments of low-lying levels. Assignments from the Adopted Levels are given under comments, if different.

γ(^{149}Eu)

All data are from 1977Fl09, unless otherwise stated.

E$_\gamma$	I$_\gamma$	E$_i$(level)	J$_i^{\pi}$	E$_f$	J$_f^{\pi}$	Mult.[‡]	δ[‡]	Comments
149.3[†] *3*		149.3	7/2$^+$	0.0	5/2$^+$			
174.9 *3*	11.4 *2*	2749.3	(27/2$^-$)	2574.4	(25/2$^+$)	D(+Q)	−0.03 *4*	A$_2$=−0.310 *29*; A$_4$=+0.014 *31* E1 in 1977Fl09.
240.7 *3*	23.3 *2*	2574.4	(25/2$^+$)	2333.7	23/2$^-$	D+Q	−0.05 *3*	A$_2$=−0.185 *22*; A$_4$=+0.014 *24* E1 in 1977Fl09.
265		1059		793.8	9/2$^-$			E$_\gamma$: from Fig. 6 in 1977Fl09, γ not listed in authors' Table II.
292.7[#] *3*	5.3 *1*	3042.0?	(29/2$^+$)	2749.3	(27/2$^-$)	D+Q	−0.09 *7*	A$_2$=−0.351 *26*; A$_4$=−0.01 *6* E1 in 1977Fl09.

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^{145}Nd(^{7}Li,3nγ),^{146}Nd(^{6}Li,3nγ) 1977Fl09 (continued)

γ(^{149}Eu) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	δ‡	Comments
								E_γ: placed from the 3543 level in the Adopted Levels.
298.2 *3*	<1	793.8	$9/2^-$	495.6	$11/2^-$			
346.3† *3*		495.6	$11/2^-$	149.3	$7/2^+$			
388.6 *3*	3.8 *1*	1997.3	$(17/2,21/2)^-$	1608.6	$19/2^-$	D+Q	−0.7 *+3−27*	A_2=+0.42 *9*; A_4=−0.08 *9* M1+E2 in 1977Fl09.
407.7# *3*	<11	2982.1?		2574.4	$(25/2^+)$			E_γ,I_γ: composite line; placed from the 1744 level in the Adopted Levels.
470.0 *3*	8.5 *2*	1997.3	$(17/2,21/2)^-$	1527.4	$(13/2,17/2)^-$	Q		A_2=+0.21 *6*; A_4=−0.02 *6* δ(O/Q)=+0.02 *+21−18*. E2 in 1977Fl09.
498.1 *3*	100.0 *15*	993.7	$15/2^-$	495.6	$11/2^-$	Q		A_2=+0.321 *32*; A_4=−0.09 *4* δ(O/Q)=−0.009 *11*. E2 in 1977Fl09.
516.2 *3*	7.7 *3*	665.5	$9/2^+$	149.3	$7/2^+$	D+Q	+3.1 *+25−13*	A_2=+0.412 *39*; A_4=+0.19 *10* M1+E2 in 1977Fl09.
533.8 *3*	18.0 *2*	1527.4	$(13/2,17/2)^-$	993.7	$15/2^-$	D+Q	0.4 *3*	A_2=+0.196 *31*; A_4=+0.009 *33* M1+E2 in 1977Fl09.
562.6 *3*	13.7 *2*	2559.9	$(21/2,25/2)^-$	1997.3	$(17/2,21/2)^-$	Q		A_2=+0.391 *37*; A_4=−0.054 *40* δ(O/Q)=+0.044 *53*. E2 in 1977Fl09.
614.9 *2*	69.8 *6*	1608.6	$19/2^-$	993.7	$15/2^-$	Q		A_2=+0.360 *21*; A_4=−0.065 *22* E2 in 1977Fl09. δ(O/Q)=−0.026 *35*.
725.1 *3*	44.2 *5*	2333.7	$23/2^-$	1608.6	$19/2^-$	Q		A_2=+0.306 *23*; A_4=−0.023 *26* δ(O/Q)=−0.052 *+53−43*. E2 in 1977Fl09.
732.2 *3*	3.4 *2*	2340.8	$(17/2^+,21/2^+)$	1608.6	$19/2^-$	D(+Q)	−0.02 *10*	A_2=−0.24 *12*; A_4=−0.10 *11* E1 in 1977Fl09.
747.8 *3*	9.5 *3*	1657.6	$9/2^+$	909.8	$7/2^+$	D+Q	>6	A_2=+0.08 *6*; A_4=+0.13 *6* M1+E2 in 1977Fl09.
760.5 *3*	9.9 *2*	909.8	$7/2^+$	149.3	$7/2^+$	D+Q	+1.35 *20*	A_2=+0.318 *24*; A_4=−0.16 *6* M1+E2 in 1977Fl09. Mult.,δ: 1977Fl09 propose this as a $7/2^+$ to $7/2^+$ transition. But 1994Ur01 use this as a reference E2 transition. Note that A_2 and A_4 in 1977Fl09 are consistent with a stretched quadruple transition (ΔJ=2), with ΔJ=0 also possible but less common.
886.8 *3*	6.9 *2*	2495.4	$(23/2^-)$	1608.6	$19/2^-$	Q		A_2=+0.19 *7*; A_4=−0.6 *8* E2 with δ(O/Q)=−0.07 *15* for J(2495)=$23/2^-$ or $15/2^-$; M1+E2 with δ(E2/M1)=−0.84 *51* for J(2495)=$19/2^-$ (1977Fl09).

† From γ spectra in Fig. 2 and level scheme Fig. 6 in 1977Fl09, not listed in authors′ Table II.
‡ From $\gamma(\theta)$ in 1977Fl09. The assignments given here are not necessarily those given by 1977Fl09 but from a reassessment (by

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γ(^{149}Eu) (continued)

the evaluators) of the angular distribution in 1977Fl09. For Mult=Q, E2 is more likely than M2 from systematics and from no evidence of long-lived states, but the present data cannot give a unique assignment.

[#] Placement of transition in the level scheme is uncertain.

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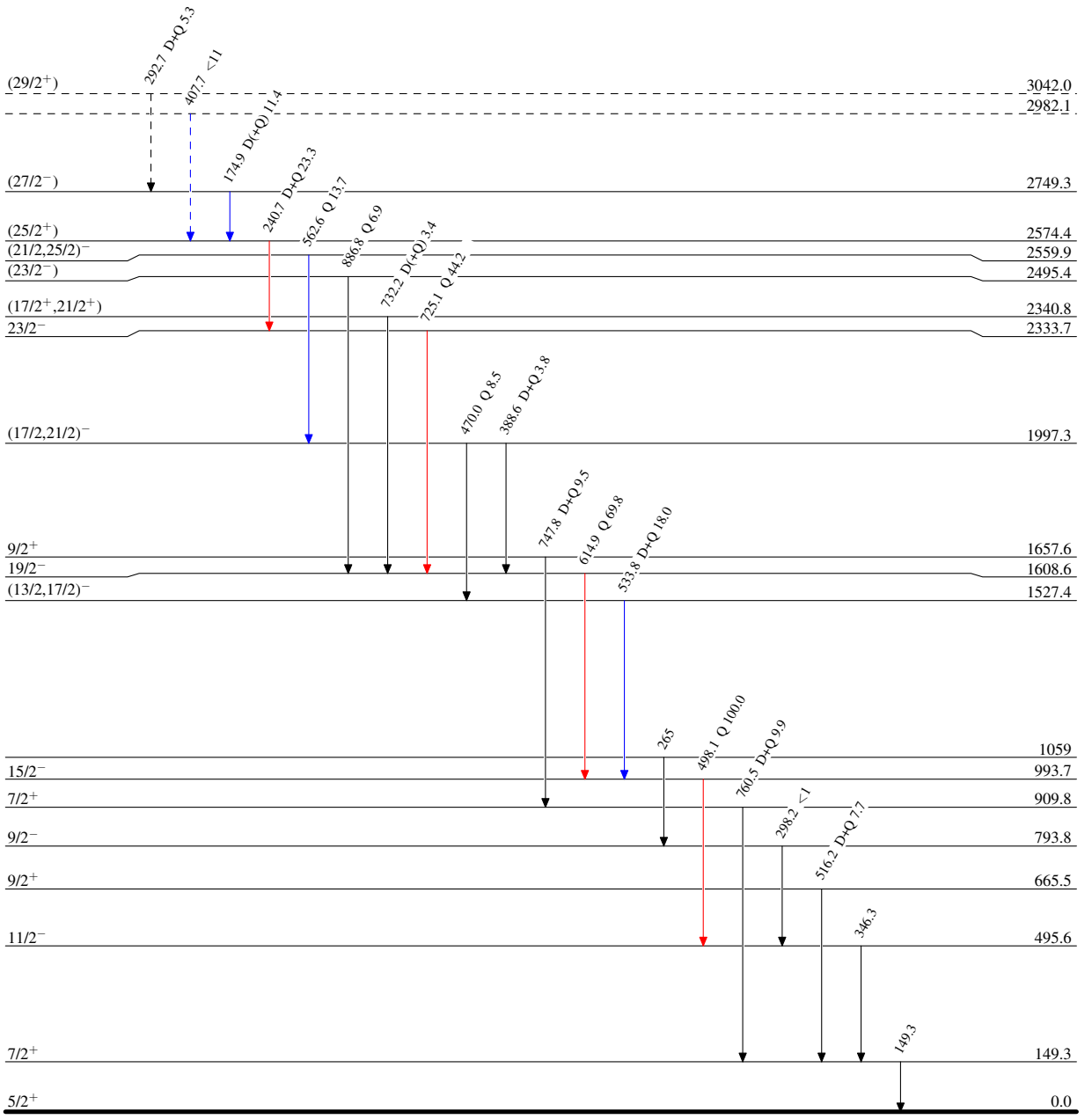
Level Scheme

Intensities: Relative I_γ

Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)



$^{149}_{63}Eu_{86}$