^{140}Ce(^{3}He,3nγ) 2010Gl05

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 154, 1 (2018)	20-Nov-2018

Dataset based on unevaluated XUNDL file compiled by B. Singh (McMaster) from 2010Gl05.
Search for one-phonon mixed-symmetry states in ^{140}Nd.
2010Gl05, 2012Gl05 (same group and experimental setup): E=19.8 MeV, measured Eγ, Iγ, $\gamma\gamma$, lifetimes by DSAM using one Euroball cluster Ge detector and five large Ge detectors at Cologne facility.

^{140}Nd Levels

E(level)	J$^{\pi}$	T$_{1/2}$	Comments
0.0	0$^+$		
774	2$^+$		
1413	0$^+$		
1489	2$^+$		
1802	4$^+$		
1935	3$^-$		
2140†	2$^+$	152 fs *62*	Lower limit of B(M1) value suggests the 2140 level as fragment of one-phonon mixed-symmetry state. Data are inconclusive whether this state exhausts the total M1 strength. T$_{1/2}$: from DSAM (2010Gl05), effective half-life.
2221	7$^-$		
2276	5$^-$		
2332†	2$^+$		Lifetime determination could not be made for this level. The 1559γ from this level can barely be observed at forward angles with a small centroid shift of −0.9 keV *4* estimated at backward angles. This suggests a fast M1 decay for 2332-keV level. However the data are too poor to be conclusive.
2365	6$^+$		
2400	4$^+$		
3183	8$^+$		

† Level investigated as candidate for one-phonon mixed-symmetry state.

γ(^{140}Nd)

2010Gl05 state that several γ rays have been observed in strong coincidence with γ rays from low-spin states but placements cannot be established unambiguously. 2012Gl05 establish two of these more firmly: 2139γ and 2333γ.

E$_\gamma$	E$_i$(level)	J$_i^{\pi}$	E$_f$	J$_f^{\pi}$	Mult.†	δ†	Comments
419	2221	7$^-$	1802	4$^+$			
446	1935	3$^-$	1489	2$^+$			
474	2276	5$^-$	1802	4$^+$			
563	2365	6$^+$	1802	4$^+$			
639	1413	0$^+$	774	2$^+$			
716	1489	2$^+$	774	2$^+$			
774	774	2$^+$	0.0	0$^+$			
818	3183	8$^+$	2365	6$^+$			
911	2400	4$^+$	1489	2$^+$			
1028	1802	4$^+$	774	2$^+$			
1161	1935	3$^-$	774	2$^+$			
1366‡	2140	2$^+$	774	2$^+$	M1(+E2)	−0.08 *8*	B(M1)>0.07 *+5−2* (2010Gl05).
1489	1489	2$^+$	0.0	0$^+$			
x1491							In strong coin with 774γ and an 1888γ.

Continued on next page (footnotes at end of table)

^{140}Ce(^{3}He,3nγ) 2010Gl05 (continued)

$\gamma(^{140}Nd)$ (continued)

E_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ[†]	Comments
1559[‡]	2332	2^+	774	2^+	M1+E2	−0.19 *9*	
1626	2400	4^+	774	2^+			
[x]1888							In strong coin with 1491γ only.
(1935)	1935	3^-	0.0	0^+			
2139	2140	2^+	0.0	0^+			
2333	2332	2^+	0.0	0^+			

[†] From 2009Wi18.
[‡] Transition analyzed to extract lifetime by DSAM.
[x] γ ray not placed in level scheme.

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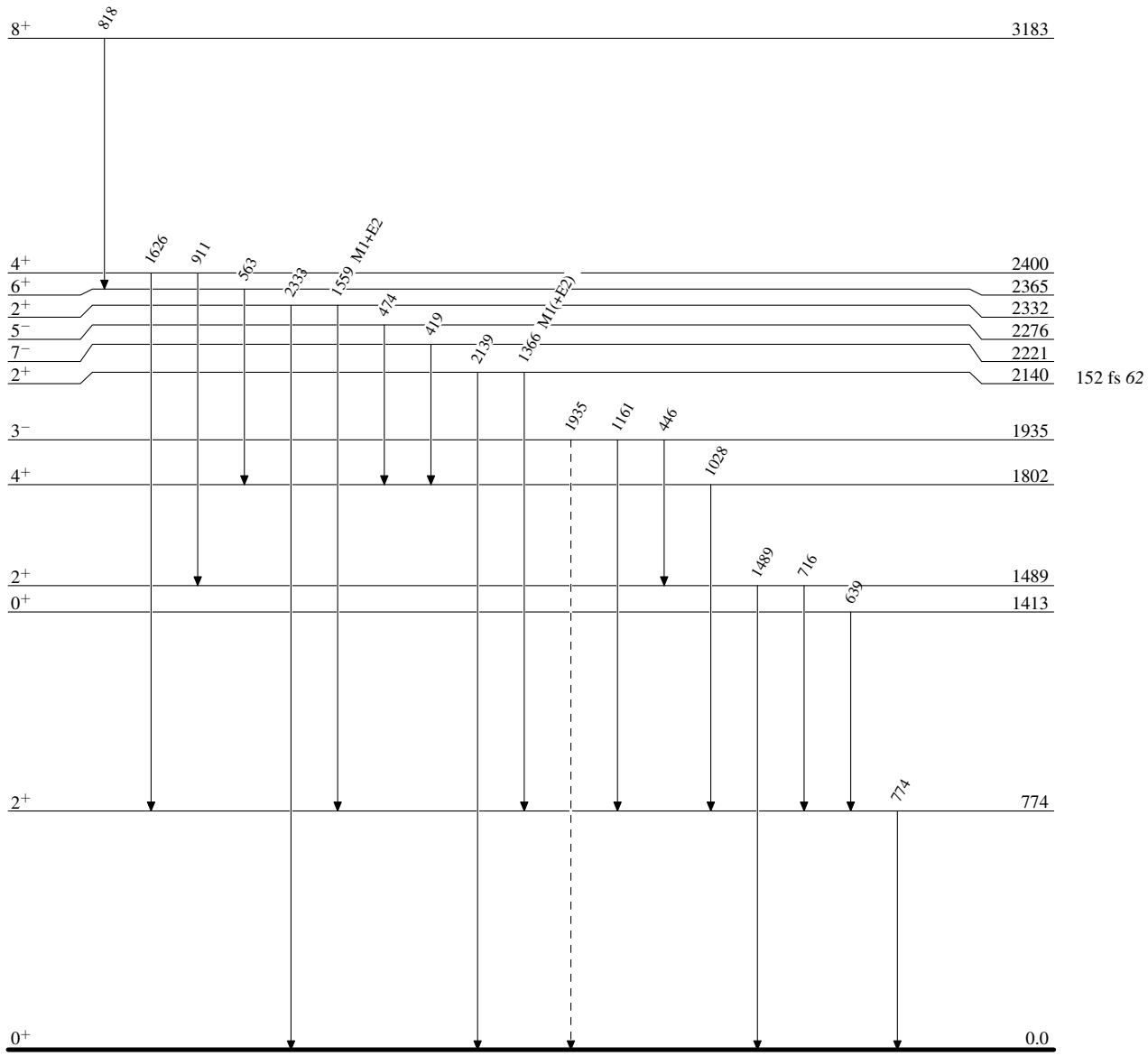
Legend

Level Scheme

γ Decay (Uncertain)



$^{140}_{60}Nd_{80}$