Adopted Levels, Gammas

History

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

Q(β^-)=1688.9 *25*; S(n)=5038.79 *7*; S(p)=9129 *15*; Q(α)=270 *30* 2021Wa16
S(2n)=12371.4 *17*, S(2p)=16940 *9* (2021Wa16).
^{149}Nd produced and identified by 1938Po05, 1946Bo25, 1950Ma05 and 1952Ru10, followed by several later studies of its decay.
Mass measurement: 1975Ka25.
Additional information 1.
1985Ma39: theory: calculated levels, J^π, spectroscopic factors using anharmonic vibrator model.
Other theoretical studies: consult the NSR database at www.nndc.bnl.gov/nsr/ for 14 references for structure and two for radioactive decay listed under 'document records' which can be accessed through web retrieval of the ENSDF database at www.nndc.bnl.gov/ensdf/.

^{149}Nd Levels

There are 123 neutron resonances in the region of 0.094 to 11.92 keV. Consult ^{148}Nd(n,γ),(n,n):resonances for energies, J^π, widths and resonance strengths.

Cross Reference (XREF) Flags

A	^{149}Pr β^- decay (2.26 min)	E	^{148}Nd(d,p)	I	^{150}Nd(^{3}He,pt)
B	^{252}Cf SF decay	F	^{148}Nd(d,pγ)	J	^{150}Nd(^{3}He,α)
C	^{148}Nd(n,γ) E=th	G	^{150}Nd(p,d)	K	^{150}Sm(μ^-,pγ)
D	^{148}Nd(n,γ),(n,n):resonances	H	^{150}Nd(pol d,t),(d,t)	L	^{238}U(^{12}C,Fγ)

E(level)[†]	J^π[#]	$T_{1/2}$	XREF	Comments
0.0	5/2$^-$	1.726 h *5*	ABC EF HIJKL	%β^-=100 μ=0.351 *10* (1970PiZR,2019StZV) Q=+1.3 *3* (1970PiZR,2021StZZ) $T_{1/2}$: unweighted average of 1.728 h *1* (γ counting,1990Ab02); 1.72 h *1* (integral γ counting,1966Ri03); 1.73 h *1* (integral γ counting,1966He04). Others: 1.5 h *3* (γ,2015Ba10); 1.5 h *2* (1999Po32, 95% confidence limit, authors give units of days which is probably a misprint); 1.73 h (γ,1981Di01); 1.8 h, 2.0 h, 2.2 h (γ counting,1973St22); 1.8 h *1* (1967Me19); 1.77 h (β counting,1964Ho03); 1.8 h *1* (γ,1960Wi10); 1.8 h *1* (ce counting,1952Ru10); 1.7 h (1950Ma05); 2.00 h *5* (β,1946Bo25); 2.0 h (β,1938Po05). J^π: from atomic beam (1964Bu09,1962Bu21), L(pol d,t)=3; L-1/2 from Ay(θ). Configuration=ν5/2[523]. μ,Q: from atomic beam method (1970PiZR).
108.5206 *10*	7/2$^-$	0.19 ns *8*	ABC EF H J L	J^π: L(pol d,t)=3; L+1/2 from Ay(θ). $T_{1/2}$: from β^- decay. Unweighted average of 0.11 ns *3* (2014Ko27, $\gamma\gamma$(t)) and 278 ps *27* (2010Ru09, $\beta\gamma\gamma$(t)).
138.4464 *8*	5/2$^-$	0.178 ns *38*	A C EF H J	J^π: L(pol d,t)=3; L-1/2 from Ay(θ). $T_{1/2}$: from β^-. Unweighted average of 0.14 ns *3* (2014Ko27, $\gamma\gamma$(t)) and 216 ps *14* (2010Ru09, $\beta\gamma\gamma$(t)).
165.0868 *8*	1/2$^-$,3/2$^-$	73 ps *11*	A C EF H	J^π: L(pol d,t)=1; L+1/2 marginally supported by Ay(θ). $T_{1/2}$: $\beta\gamma\gamma$(t) (2010Ru09) in β^-.
192 *2*	(11/2$^-$,9/2$^-$)		H	J^π: L(pol d,t)=(5); L+1/2 marginally supported by Ay(θ).
220.7058 *23*	9/2$^-$	1.61 ns *4*	ABC EF H J	J^π: L(pol d,t)=5; L-1/2 from Ay(θ). $T_{1/2}$: weighted average of 1.60 ns *4* (2014Ko27, $\gamma\gamma$(t)); 1.65 ns *19* (2010Ru09, $\beta\gamma\gamma$(t)) in β^-; and 2.1 ns *5* from pγ(t) in (d,pγ)

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Adopted Levels, Gammas (continued)

^{149}Nd Levels (continued)

E(level)†	Jπ#	$T_{1/2}$	XREF	Comments
				(1979Ka16,1977HaXX).
258.3302 *9*	3/2⁻	0.203 ns *8*	A C F H	Jπ: L(pol d,t)=1; L+1/2 marginally supported by Ay(θ). However, Jπ=1/2⁻ is excluded by γ to 7/2⁻ which cannot be M3 from RUL. $T_{1/2}$: from β⁻. Weighted average of 0.22 ns *3* (2014Ko27, γγ(t)) and 202 ps *8* (2010Ru09, βγγ(t)).
270.8585 *23*	(9/2⁺)	0.42 ns *3*	ABC F H J L	Jπ: L(pol d,t)=3,4; L+1/2 from Ay(θ). Comparison of γ-ray transition probabilities in (d,pγ) with those from model-dependent calculations; γ from (11/2⁻) and population in ^{252}Cf SF decay also support 9/2⁺. L(^{3}He,α)=(3) is inconsistent with (9/2⁺). $T_{1/2}$: from β⁻. Weighted average of 0.42 ns *3* (2014Ko27, γγ(t)) and 424 ps *60* (2010Ru09, βγγ(t)). Other: 5.1 ns *3* from γγ(t) and/or pγ(t) in (d,pγ) is in severe disagreement with the values from β⁻ decay.
285.4819 *11*	1/2⁻	126 ps *13*	A C EF H	Jπ: L(pol d,t)=1; L-1/2 from Ay(θ). $T_{1/2}$: βγγ(t) (2010Ru09) in β⁻.
316.230 *3*	(5/2⁻,7/2⁻)	56 ps *11*	A C eF h J	Jπ: L(pol d,t)=3 for 316+321; L-1/2 from Ay(θ). 1981Ha39 favor J=L−1/2. $T_{1/2}$: βγγ(t) (2010Ru09) in β⁻ decay.
321.1429 *15*	(5/2⁻,7/2⁻)	74 ps *17*	A C eF h	Jπ: see comment for 316 level. $T_{1/2}$: βγγ(t) (2010Ru09) in β⁻ decay.
332.9326 *17*	5/2⁺	14 ps *8*	A C F H	Jπ: L(pol d,t)=2; L+1/2 marginally supported by Ay(θ). However, 3/2⁺ is excluded by γ to 7/2⁻ which cannot be M2 from RUL. $T_{1/2}$: βγγ(t) (2010Ru09) in β⁻ decay.
340.4@ *10*	(13/2⁺)		EF H J L	Jπ: L(^{3}He,α)=6; 13/2⁺ is favored from systematics.
365.9315 *15*	3/2⁻	<0.5 ns	A C EF H J	XREF: J(375). Jπ: L(pol d,t)=1; L+1/2 marginally supported by Ay(θ). However, 1/2⁻ is excluded by γ to 7/2⁻ which cannot be M3 from RUL. $T_{1/2}$: pγ(t) in (d,pγ).
403.7291 *14*	1/2⁻	23 ps *8*	A C E H	Jπ: L(pol d,t)=1; L-1/2 from Ay(θ). $T_{1/2}$: βγγ(t) (2010Ru09) in β⁻ decay.
450.04 *9*	5/2⁻	≤10 ps	A H j	XREF: H(447). Jπ: L(pol d,t)=3 for a doublet (447+459); L+1/2 is favored by Ay(θ). Also L(^{3}He,α)=3 for a 455 group. $T_{1/2}$: βγγ(t) (2010Ru09) in β⁻ decay.
459.529 *4*	(3/2⁻,5/2⁻)	31 ps *14*	A C E H j	Jπ: γs to 1/2⁻ and 7/2⁻. See also comment for 450 level. $T_{1/2}$: βγγ(t) (2010Ru09) in β⁻ decay.
474.59 *5*	(5/2⁺,7/2)	≤10 ps	A	Jπ: log *ft*=7.2 from (5/2⁺); γ to (9/2⁺). $T_{1/2}$: βγγ(t) (2010Ru09) in β⁻ decay.
482.6733 *14*	1/2⁺	<0.8 ns	A C EF H	Jπ: L(d,t)=0. $T_{1/2}$: pγ(t) in (d,pγ).
511 *2*	11/2⁺,13/2⁺		E H j	XREF: E(521). Jπ: L(d,t)=6.
517.44 *4*	(3/2,5/2,7/2)		A C j	Jπ: log *ft*=7.2 from (5/2⁺).
548.655 *4*	3/2⁻	<0.5 ns	A C EF H J	Jπ: L(pol d,t)=1; L+1/2 marginally supported by Ay(θ). However, 1/2⁻ is excluded by γ to 5/2⁺ which cannot be M2 from RUL. $T_{1/2}$: pγ(t) in (d,pγ).
571.407 *4*	3/2⁺		A C H	Jπ: L(pol d,t)=2; L-1/2 from Ay(θ).
587.7@ *15*	(17/2⁺)		L	
590 *10*	(9/2⁻,11/2⁻)		J	Jπ: L(^{3}He,α)=5.
593.22 *4*	(5/2⁺)		A E H	Jπ: L(pol d,t)=2; L+1/2 from Ay(θ).

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Adopted Levels, Gammas (continued)

^{149}Nd Levels (continued)

E(level)†	Jπ#	XREF	Comments
603.42 *8*		A	
612 *2*	(9/2⁻,11/2,13/2⁺)	H	Jπ: L(d,t)=5,6 (2008Ja01); (6) (1973Bu02).
646 *2*	11/2⁻,9/2⁻	H J	Jπ: L(^{3}He,α)=5; L(pol d,t)=5,(6); L+1/2 is marginally supported by Ay(θ).
689 *2*		H	
705.128 *25*	(3/2,5/2)	A C e h j	Jπ: L(pol d,t)=L(^{3}He,α)=2 gives 3/2⁺,5/2⁺ for 705+709 levels; L-1/2 is preferred from Ay(θ); possible β⁻ feeding from (5/2⁺) parent.
709.045 *18*	(3/2,5/2⁻)	A C e h j	Jπ: γs to 1/2⁻, 5/2⁻ and 5/2⁺. See also comment for 705 level.
741.06 *8*	3/2⁺	A C E H J	Jπ: L(pol d,t)=2; L-1/2 from Ay(θ).
796 *2*	1/2⁺	E H	XREF: E(807). Jπ: L(pol d,t)=0.
804 *2*		H	
814.40 *3*	1/2⁺	A C H J	Jπ: L(pol d,t)=0.
836 *2*	1/2⁻,3/2⁻	E H J	XREF: E(830). Jπ: L(d,t)=1.
862.81 *7*	(7/2)⁺	A H J	Jπ: L(d,t)=4; γ to 5/2⁻. L(^{3}He,α)=2 for 873 *10* level seems to agree with Jπ value for 881 level, rather than with that for 862.8 level.
881.36 *7*	3/2⁺	A C E H J	Jπ: L(pol d,t)=2; L-1/2 from Ay(θ). See also comment for 862.8 level.
913.57 *8*	(1/2,3/2)	C e h	Jπ: primary γ from 1/2⁺ capture state; L(d,t)=1 for 913 and/or 920 levels suggests negative for either or both levels;
920.65 *7*	(3/2,5/2,7/2⁻)	A e h J	Jπ: possible β⁻ feeding from (5/2⁺); γ to 3/2⁻. See also comment for 913 level.
956 *2*	5/2⁻,7/2⁻	E H j	Jπ: L(d,t)=3.
963 *4*		H j	
976.4@ *18*	(21/2⁺)	L	
985.15 *10*	1/2⁺	E H J	XREF: E(992). Jπ: L(pol d,t)=0.
1012.6? *3*		A	
1025 *2*	3/2⁻,1/2⁻	E H	Jπ: L(pol d,t)=1; L+1/2 marginally supported by Ay(θ).
1045 *2*	3/2⁺,5/2⁺	H J	XREF: J(1054). Jπ: L(pol d,t)=2; L-1/2 marginally supported by Ay(θ).
1067 *2*		E H	
1082 *2*		E H	
1129 *2*	5/2⁺,3/2⁺	H j	XREF: j(1144). Jπ: L(pol d,t)=2; L+1/2 marginally supported by Ay(θ).
1149 *2*	3/2⁺,5/2⁺	H j	XREF: j(1144). Jπ: L(pol d,t)=2; L-1/2 marginally supported by Ay(θ). L(^{3}He,α)=(5) is inconsistent, but L(^{3}He,α)=2 is also possible.
1168 *4*		H	
1178 *2*		e H	
1189 *4*		e H	
1220 *2*		H	
1232 *2*		H	
1245 *2*	1/2⁻,3/2⁻	E H J	XREF: J(1260). Jπ: L(d,t)=1.
1283 *2*	1/2⁻	E H	Jπ: L(pol d,t)=1; L-1/2 from Ay(θ).
1305.7& *18*	(19/2⁻)	L	
1311 *4*		H	
1358 *2*	1/2⁺	E HI	Jπ: L(pol d,t)=0.
1386 *6*		E	
1413 *6*		E H	
1446 *6*		E	
1465 *2*		H	
1469.0@ *20*	(25/2⁺)	L	
1481 *2*		E H	
1505 *2*	1/2⁻,3/2⁻	E H	Jπ: L(d,t)=1.

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Adopted Levels, Gammas (continued)

^{149}Nd Levels (continued)

E(level)†	Jπ#	XREF	Comments
1531 *2*	1/2−,3/2−	E H	Jπ: L(d,t)=1.
1553 *2*	1/2−,3/2−	E H J	Jπ: L(d,t)=1.
1594 *6*		E	
1622 *2*	9/2−,11/2−	E H J	Jπ: L(d,t)=L(^{3}He,α)=5.
1634 *6*		E	
1682 *5*		E H	XREF: E(1671).
1683.4& *20*	(23/2−)	L	
1708 *2*	9/2−,11/2−	E H J	Jπ: L(d,t)=L(^{3}He,α)=5.
1721 *5*	3/2+,5/2+	H	Jπ: L(d,t)=2.
1742‡ *5*	3/2+,5/2+	E H	Jπ: L(d,t)=2.
1785‡ *5*	3/2+,5/2+	E H	Jπ: L(d,t)=2.
1797 *2*	3/2+,5/2+	H J	Jπ: L(pol d,t)=2; L-1/2 marginally supported by Ay(θ).
1819 *5*		E H	
1857‡ *5*	3/2+,5/2+	E H j	Jπ: L(d,t)=2.
1868 *6*		E j	
1884‡ *5*		E H j	
1913 *5*		H	
1925 *6*		E	
1953‡ *5*	3/2+,5/2+	E H	XREF: E(1947). Jπ: L(d,t)=2.
1981 *5*	3/2+,5/2+	H J	Jπ: L(d,t)=2.
2031 *5*	3/2+,5/2+	H	Jπ: L(d,t)=2.
2040.4@ *23*	(29/2+)	L	
2054 *5*		H	
2065 *6*		H	
2081.0& *23*	(27/2−)	L	
2081 *5*	3/2+,5/2+	H	Jπ: L(d,t)=2.
2099‡ *5*		E H	
2121 *5*		H	
2147‡ *5*		E H	
2231 *5*	3/2+,5/2+	H	Jπ: L(d,t)=2.
2266 *5*		H	
2297 *5*	3/2+,5/2+	H	Jπ: L(d,t)=2.
2321 *10*		J	
2595.4& *25*	(31/2−)	L	
2650.4 *25*		L	
2672.2@ *25*	(33/2+)	L	
3179& *3*	(35/2−)	L	
3345@ *3*	(37/2+)	L	
4018@ *3*	(41/2+)	L	
4646@ *3*	(45/2+)	L	
(5038.82 *3*)	1/2+	C	Jπ: s-wave capture in ^{148}Nd (Jπ=0+). E(level): S(n)=5038.79 *7* (2021Wa16).

† From a least-squares fit to Eγ data for levels populated in γ-ray studies, assuming 1 keV uncertainty when not stated. Uncertainties of five Eγ values were doubled to obtain an acceptable reduced χ^2=2.1 in place of original 3.8, as compared to critical χ^2=3.8. For levels populated only in particle-transfer studies, the energies are from (d,t), due to better energy resolution in this reaction. Exceptions are noted. A few levels are populated only in (d,p) and/or (^{3}He,α).

‡ Weighted average of values from (d,t) and (p,d).

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Adopted Levels, Gammas (continued)

^{149}Nd Levels (continued)

[#] All L-transfers are from 0^+ targets.

[@] Band(A): Band based on $\nu i_{13/2}$. Band proposed in ^{238}U(^{12}C,Fγ) (2006Ve04).

[&] Band(B): Possible $\nu i_{13/2} \otimes 3^-$ octupole band. Band proposed in ^{238}U(^{12}C,Fγ) (2006Ve04).

Adopted Levels, Gammas (continued)

γ(^{149}Nd)

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[‡]	E_f	J^{π}_f	Mult.	α[c]	Comments
108.5206	7/2⁻	108.520 1	100	0.0	5/2⁻	[M1][b]	1.121 16	B(M1)(W.u.)=0.043 +31−13
138.4464	5/2⁻	138.447 1	100	0.0	5/2⁻	[M1][b]	0.563 8	B(M1)(W.u.)=0.030 +8−5
165.0868	1/2⁻,3/2⁻	165.087 1	100	0.0	5/2⁻	[M1][b]	0.344 5	B(M1)(W.u.)=0.050 +9−7
220.7058	9/2⁻	112.185 2	100 7	108.5206	7/2⁻	[M1+E2]	1.24 22	B(M1)(W.u.)=0.00393 16 if M1, B(E2)(W.u.)=146 5 if E2.
		220.78 5	39 6	0.0	5/2⁻	[E2]	0.1409 20	B(E2)(W.u.)=2.07 +36−33 I_{γ}: weighted average of 40 6 in β^- decay and 21 21 (from $I\gamma<42$) in (n,γ).
258.3302	3/2⁻	93.243 1	7.4[&] 14	165.0868	1/2⁻,3/2⁻	[M1][b]	1.730 24	B(M1)(W.u.)=0.0065 11
		119.885 1	10.5 5	138.4464	5/2⁻	[M1+E2]	1.00 15	B(M1)(W.u.)=0.00438 +32−30 if M1, B(E2)(W.u.)=164 11 if E2.
		149.790 8	1.3 2	108.5206	7/2⁻	[E2]	0.526 7	B(E2)(W.u.)=6.7 11
		258.327 2	100 4	0.0	5/2⁻	[M1+E2]	0.093 9	B(M1)(W.u.)=0.00410 21 if M1, B(E2)(W.u.)=34.1 17 if E2.
270.8585	(9/2⁺)	162.338 2	100	108.5206	7/2⁻	[E1]	0.0689 10	B(E1)(W.u.)=1.25×10^{-4} 9
285.4819	1/2⁻	120.395 1	100[a] 11	165.0868	1/2⁻,3/2⁻	[M1][b]	0.835 12	B(M1)(W.u.)=0.050 +6−5
		147.036 2	4.4[a] 5	138.4464	5/2⁻	[E2]	0.561 8	B(E2)(W.u.)=31 +6−5
		285.511[@] 20	10 1	0.0	5/2⁻	[E2]	0.0612 9	B(E2)(W.u.)=2.51 +48−40
316.230	(5/2⁻,7/2⁻)	151.120 20	7.5 8	165.0868	1/2⁻,3/2⁻	[M1,E2]	0.475 35	B(M1)(W.u.)=0.0034 +9−7 if M1, B(E2)(W.u.)=81 +22−16 if E2.
		177.783 10	15.4[&] 28	138.4464	5/2⁻	[M1+E2]	0.286 7	B(M1)(W.u.)=0.0043 +13−10 if M1, B(E2)(W.u.)=74 +23−17 if E2.
		207.710 3	100 5	108.5206	7/2⁻	[M1+E2]	0.178 6	B(M1)(W.u.)=0.0173 +43−29 if M1, B(E2)(W.u.)=2.2×10^{2} +6−4 if E2.
		316.236 10	99 4	0.0	5/2⁻	[M1+E2]	0.052 8	B(M1)(W.u.)=0.0049 +12−8 if M1, B(E2)(W.u.)=27 +7−5 if E2.
321.1429	(5/2⁻,7/2⁻)	156.061 2	73[&] 17	165.0868	1/2⁻,3/2⁻	[M1][b]	0.403 6	B(M1)(W.u.)=0.017 +6−5
		182.694 2	58[&] 18	138.4464	5/2⁻	[M1+E2]	0.263 5	B(M1)(W.u.)=0.0086 +35−27 if M1, B(E2)(W.u.)=1.4×10^{2} +6−5 if E2.
		212.613 4	41 2	108.5206	7/2⁻	[M1+E2]	0.166 7	B(M1)(W.u.)=0.0039 +13−8 if M1, B(E2)(W.u.)=47 +16−10 if E2.
		321.124 8	100 8	0.0	5/2⁻	[M1+E2]	0.050 7	B(M1)(W.u.)=0.0027 +9−6 if M1, B(E2)(W.u.)=14.6 +50−30 if E2.
332.9326	5/2⁺	194.468[@] 10	1.56 13	138.4464	5/2⁻	[E1]	0.0423 6	B(E1)(W.u.)=3.3×10^{-5} +33−13
		224.437 10	6.3 6	108.5206	7/2⁻	[E1]	0.0288 4	B(E1)(W.u.)=9×10^{-5} +9−3
		332.944 13	100 5	0.0	5/2⁻	[E1]	0.01042 15	B(E1)(W.u.)=0.00043 +41−16
340.4	(13/2⁺)	69.5	100	270.8585	(9/2⁺)			
365.9315	3/2⁻	32.999[@] 1	≈19	332.9326	5/2⁺	[E1]	0.916 13	B(E1)(W.u.)>4.0×10^{-4}
		80.449[@] 2	16.1 17	285.4819	1/2⁻	[M1+E2]	3.7 11	B(M1)(W.u.)>0.004 if M1; B(E2)(W.u.)>306 exceeds RUL=300 if E2, suggesting transition is not pure E2.
		200.844[@] 5	9.8 10	165.0868	1/2⁻,3/2⁻	[M1+E2]	0.197 5	B(M1)(W.u.)>1.4×10^{-4} if M1, B(E2)(W.u.)>1.8 if E2.
		227.481[d] 6	50[d] 5	138.4464	5/2⁻	[M1+E2]	0.135 8	B(M1)(W.u.)>4.9×10^{-4} if M1, B(E2)(W.u.)>5.2 if E2.

$^{149}_{60}$Nd$_{89}$-6

$\gamma(^{149}$Nd) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.	α[c]	Comments
365.9315	3/2⁻	257.442[@] *20*	5.5 *5*	108.5206	7/2⁻	[E2]	0.0852 *12*	B(E2)(W.u.)>0.3
		365.953 *8*	100 *10*	0.0	5/2⁻	[M1+E2]	0.035 *6*	B(M1)(W.u.)>2.4×10^{-4} if M1, B(E2)(W.u.)>0.99 if E2.
403.7291	1/2⁻	118.244[@] *3*	5.7 *5*	285.4819	1/2⁻	[M1]	0.879 *12*	B(M1)(W.u.)=0.014 *+8−4*
		145.397 *2*	18.6[a] *19*	258.3302	3/2⁻	[M1][b]	0.491 *7*	B(M1)(W.u.)=0.025 *+13−7* I_γ: 100 *40* in β^- decay is too large.
		238.638 *3*	100[a] *10*	165.0868	1/2⁻,3/2⁻	[M1][b]	0.1258 *18*	B(M1)(W.u.)=0.031 *+15−8* 238.6γ is an unresolved doublet in β^- decay, perhaps the intensity split is not correct in that dataset.
		265.290 *8*	41[a] *4*	138.4464	5/2⁻	[E2]	0.0774 *11*	B(E2)(W.u.)=72 *+37−20* I_γ: 118 *15* in β^- decay is too large.
		403.51 *17*	33[a] *5*	0.0	5/2⁻	[E2]	0.02143 *30*	B(E2)(W.u.)=7.1 *+37−21* I_γ: 95 *25* in β^- decay is too large.
450.04	5/2⁻	285.8[#] *1*	25 *5*	165.0868	1/2⁻,3/2⁻	[M1,E2]	0.069 *8*	E_γ: Poor fit. Level-energy difference=284.96. Uncertainty doubled in the fitting procedure. B(M1)(W.u.)≥0.014 if M1, B(E2)(W.u.)≥93 if E2.
		341.31[#] *5*	100 *9*	108.5206	7/2⁻	[M1+E2]	0.042 *7*	E_γ: level-energy difference=341.52. Uncertainty doubled in the fitting procedure. B(M1)(W.u.)≥0.039 if M1, B(E2)(W.u.)≥187 if E2.
459.529	(3/2⁻,5/2⁻)	143.299 *2*	62 *7*	316.230	(5/2⁻,7/2⁻)	[M1+E2]	0.56 *5*	B(M1)(W.u.)=0.043 *+32−14* if M1. B(E2)(W.u.)=1.1×10^{3} *+8−4* exceeds RUL=300 if E2, suggesting transition is not pure E2.
		174.031 *18*	11[a] *2*	285.4819	1/2⁻	[M1+E2]	0.306 *9*	B(M1)(W.u.)=0.0042 *+33−15* if M1, B(E2)(W.u.)=8×10^{1} *+6−3* if E2.
		294.44 *4*	57[a] *7*	165.0868	1/2⁻,3/2⁻	[M1+E2]	0.064 *8*	B(M1)(W.u.)=0.0045 *+34−15* if M1, B(E2)(W.u.)=29 *+23−10* if E2.
		321.28[d#e] *10*	<10[d]	138.4464	5/2⁻	[M1+E2]	0.050 *7*	B(M1)(W.u.)<0.0013 if M1, B(E2)(W.u.)<6.7 if E2.
		351.001 *20*	70 *11*	108.5206	7/2⁻	[M1+E2]	0.039 *6*	B(M1)(W.u.)=0.0033 *+25−11* if M1, B(E2)(W.u.)=15 *+11−5* if E2.
		459.52 *11*	100 *10*	0.0	5/2⁻	[M1+E2]	0.019 *4*	B(M1)(W.u.)=0.0021 *+16−7* if M1, B(E2)(W.u.)=5.4 *+41−18* if E2.
474.59	(5/2⁺,7/2)	204.15[#] *10*	14.3 *14*	270.8585	(9/2⁺)			E_γ: poor fit. Level-energy difference=203.73. Uncertainty doubled in the fitting procedure.
		366.02[#] *10*	50 *5*	108.5206	7/2⁻			
		474.57[#] *6*	100 *6*	0.0	5/2⁻			
482.6733	1/2⁺	78.943[@] *1*	15 *2*	403.7291	1/2⁻	[E1]	0.494 *7*	B(E1)(W.u.)>2.5×10^{-5}
		116.742 *1*	92[a] *9*	365.9315	3/2⁻	[E1]	0.1697 *24*	B(E1)(W.u.)>5.2×10^{-5}
		197.194 *2*	100[a] *10*	285.4819	1/2⁻	[E1]	0.0407 *6*	B(E1)(W.u.)>1.2×10^{-5}
		224.350[@] *10*	40 *5*	258.3302	3/2⁻	[E1]	0.0289 *4*	B(E1)(W.u.)>3.0×10^{-6}
		317.57[@] *3*	15.8 *19*	165.0868	1/2⁻,3/2⁻	[E1]	0.01173 *16*	B(E1)(W.u.)>4.1×10^{-7}
517.44	(3/2,5/2,7/2)	408.92 *15*	12.8 *10*	108.5206	7/2⁻			

$^{149}_{60}$Nd$_{89}$-7

$^{149}_{60}Nd_{89}$-8

γ(^{149}Nd) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.	α[c]	Comments
517.44	(3/2,5/2,7/2)	517.44 *4*	100 *4*	0.0	$5/2^-$			
548.655	$3/2^-$	215.724 *4*	46 *4*	332.9326	$5/2^+$	[E1]	0.0320 *4*	B(E1)(W.u.)>5.9×10^{-6}
		227.481[d] *6*	100[d] *10*	321.1429	$(5/2^-,7/2^-)$	[M1,E2]	0.135 *8*	E_γ: poor fit. Level-energy difference=227.512. Uncertainty doubled in the fitting procedure. B(M1)(W.u.)>0.001 if M1, B(E2)(W.u.)>11 if E2.
		383.566 *21*	56[&] *17*	165.0868	$1/2^-,3/2^-$	[M1+E2]	0.030 *6*	B(M1)(W.u.)>9.6×10^{-5} if M1, B(E2)(W.u.)>0.36 if E2.
		410.29 *3*	73 *7*	138.4464	$5/2^-$	[M1+E2]	0.025 *5*	B(M1)(W.u.)>1.2×10^{-4} if M1, B(E2)(W.u.)>0.41 if E2.
		548.72[@] *17*	15.7 *14*	0.0	$5/2^-$	[M1+E2]	0.0118 *27*	B(M1)(W.u.)>1.1×10^{-5} if M1, B(E2)(W.u.)>0.02 if E2.
571.407	$3/2^+$	88.731 *4*	2.2[a] *3*	482.6733	$1/2^+$			
		238.453 *20*	23[&] *10*	332.9326	$5/2^+$			
		313.088 *14*	27[&] *9*	258.3302	$3/2^-$			
		406.400 *12*	100 *5*	165.0868	$1/2^-,3/2^-$			E_γ: poor fit. Level-energy difference=406.319. Uncertainty doubled in the fitting procedure.
		432.95 *3*	80 *20*	138.4464	$5/2^-$			
587.7	$(17/2^+)$	247.3		340.4	$(13/2^+)$			
593.22	$(5/2^+)$	260.10[#] *9*	79 *15*	332.9326	$5/2^+$			
		322.40[#] *4*	100 *15*	270.8585	$(9/2^+)$			
603.42		494.90[#] *8*	100	108.5206	$7/2^-$			
705.128	(3/2,5/2)	245.588 *25*	84 *8*	459.529	$(3/2^-,5/2^-)$			
		389.00 *10*	100 *11*	316.230	$(5/2^-,7/2^-)$			
		540.1[#] *3*	92 *15*	165.0868	$1/2^-,3/2^-$			γ not reported in (n,γ).
		566.85 *16*	69 *6*	138.4464	$5/2^-$			
709.045	$(3/2,5/2^-)$	249.51[@] *5*	10.5 *12*	459.529	$(3/2^-,5/2^-)$			
		305.325[@] *22*	34 *4*	403.7291	$1/2^-$			
		375.95 *8*	27.0 *23*	332.9326	$5/2^+$			
		387.93 *12*	30 *5*	321.1429	$(5/2^-,7/2^-)$			
		450.72 *5*	82 *10*	258.3302	$3/2^-$			
		545.3[e] *5*	10 *4*	165.0868	$1/2^-,3/2^-$			γ not reported in (n,γ).
		570.72 *10*	100 *10*	138.4464	$5/2^-$			
741.06	$3/2^+$	455.55[@] *20*	21.8 *23*	285.4819	$1/2^-$			
		576.03 *12*	100 *9*	165.0868	$1/2^-,3/2^-$			
814.40	$1/2^+$	354.89[@] *4*	29 *3*	459.529	$(3/2^-,5/2^-)$			
		528.91 *10*	100 *9*	285.4819	$1/2^-$			
		649.22 *16*	17 *3*	165.0868	$1/2^-,3/2^-$			
		675.90 *7*	191 *15*	138.4464	$5/2^-$	[M2]	0.02460 *34*	γ from $\gamma\gamma$-coin in (n,γ) and ^{149}Pr β^-, but placement seems unlikely, since it requires M2 for 675.9γ.
862.81	$(7/2)^+$	592.1[#] *2*	53 *13*	270.8585	$(9/2^+)$			
		642.03[#] *8*	100 *23*	220.7058	$9/2^-$			
		724.7[#] *2*	63 *15*	138.4464	$5/2^-$			

From ENSDF

$^{149}_{60}Nd_{89}$-8

Adopted Levels, Gammas (continued)

γ(^{149}Nd) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Comments
881.36	3/2$^+$	622.97[#] 10	100 8	258.3302	3/2$^-$	
		716.5[#] 3	19 9	165.0868	1/2$^-$,3/2$^-$	γ not reported in (n,γ).
		742.94[#] 10	78 8	138.4464	5/2$^-$	γ not reported in (n,γ).
913.57	(1/2,3/2)	430.76 15	100	482.6733	1/2$^+$	
920.65	(3/2,5/2,7/2$^-$)	604.07[#] 14	67 3	316.230	(5/2$^-$,7/2$^-$)	
		662.45[#] 9	100 7	258.3302	3/2$^-$	
		755.81[#] 15	47 7	165.0868	1/2$^-$,3/2$^-$	
		781.99[#] 15	72 11	138.4464	5/2$^-$	
976.4	(21/2$^+$)	388.7		587.7	(17/2$^+$)	
985.15	1/2$^+$	436.5 1		548.655	3/2$^-$	E_γ: from γγ in (d,tγ).
		820 1		165.0868	1/2$^-$,3/2$^-$	E_γ: from γγ in (d,tγ).
1012.6?		874.11[e] 26	100	138.4464	5/2$^-$	
1305.7	(19/2$^-$)	718		587.7	(17/2$^+$)	
1469.0	(25/2$^+$)	492.6		976.4	(21/2$^+$)	
1683.4	(23/2$^-$)	707		976.4	(21/2$^+$)	
2040.4	(29/2$^+$)	571.4		1469.0	(25/2$^+$)	
2081.0	(27/2$^-$)	612		1469.0	(25/2$^+$)	
2595.4	(31/2$^-$)	555		2040.4	(29/2$^+$)	
2650.4		610		2040.4	(29/2$^+$)	
2672.2	(33/2$^+$)	631.8		2040.4	(29/2$^+$)	
3179	(35/2$^-$)	507		2672.2	(33/2$^+$)	
3345	(37/2$^+$)	672.9		2672.2	(33/2$^+$)	
4018	(41/2$^+$)	673.1		3345	(37/2$^+$)	
4646	(45/2$^+$)	627.6		4018	(41/2$^+$)	
(5038.82)	1/2$^+$	4125.13 9	4.7 5	913.57	(1/2,3/2)	
		4224.33 8	5.6 6	814.40	1/2$^+$	
		4297.73 10	2.12 25	741.06	3/2$^+$	
		4329.74 7	11.6 11	709.045	(3/2,5/2$^-$)	
		4467.28 8	2.99 25	571.407	3/2$^+$	
		4556.07 9	2.62 25	482.6733	1/2$^+$	
		4634.98 8	4.0 4	403.7291	1/2$^-$	
		4672.82 7	100.0 10	365.9315	3/2$^-$	
		4753.26 7	20.2 20	285.4819	1/2$^-$	
		4780.43 10	2.00 25	258.3302	3/2$^-$	
		4873.68 8	6.6 6	165.0868	1/2$^-$,3/2$^-$	

† From (n,γ) for low-spin (J≤9/2) levels, unless otherwise stated. For high-spin (J>9/2) levels, values are from ^{238}U(^{12}C,Fγ).

‡ From weighted averages of values from (n,γ) and β^- decay, when a level and gamma are seen in both the studies, unless otherwise indicated.

\# From ^{149}Pr β^-.

$^{149}_{60}Nd_{89}$-9

γ(^{149}Nd) (continued)

[@] γ from (n,γ) only, not reported in β^- decay.
[&] Unweighted average of values from (n,γ) and β^- decay, when the two values are in poor agreement.
[a] From (n,γ).
[b] Dominant M1 expected from RUL=300 for E2 transitions.
[c] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[d] Multiply placed with intensity suitably divided.
[e] Placement of transition in the level scheme is uncertain.

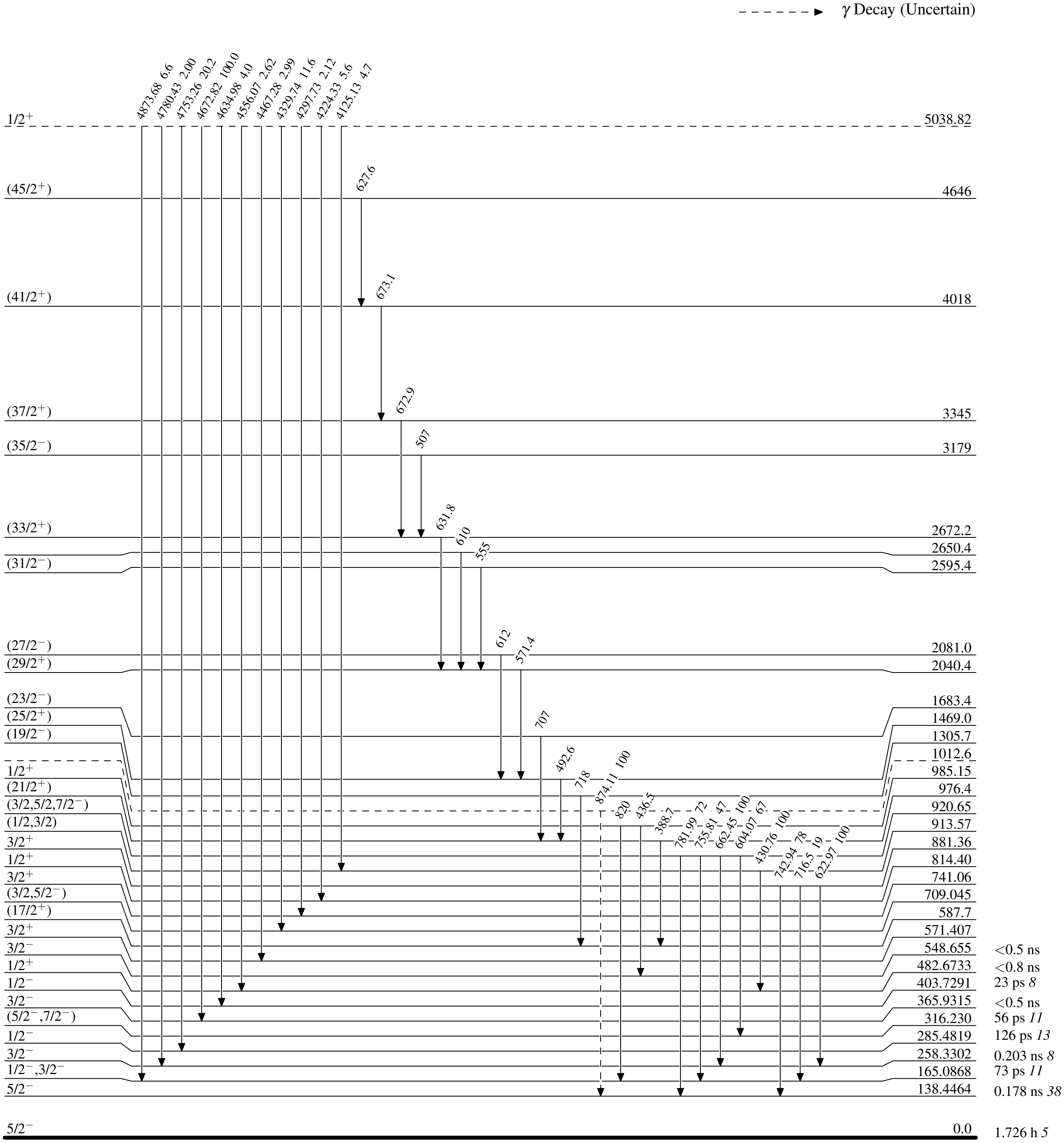
$^{149}_{60}$Nd$_{89}$-10

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level



$^{149}_{60}Nd_{89}$

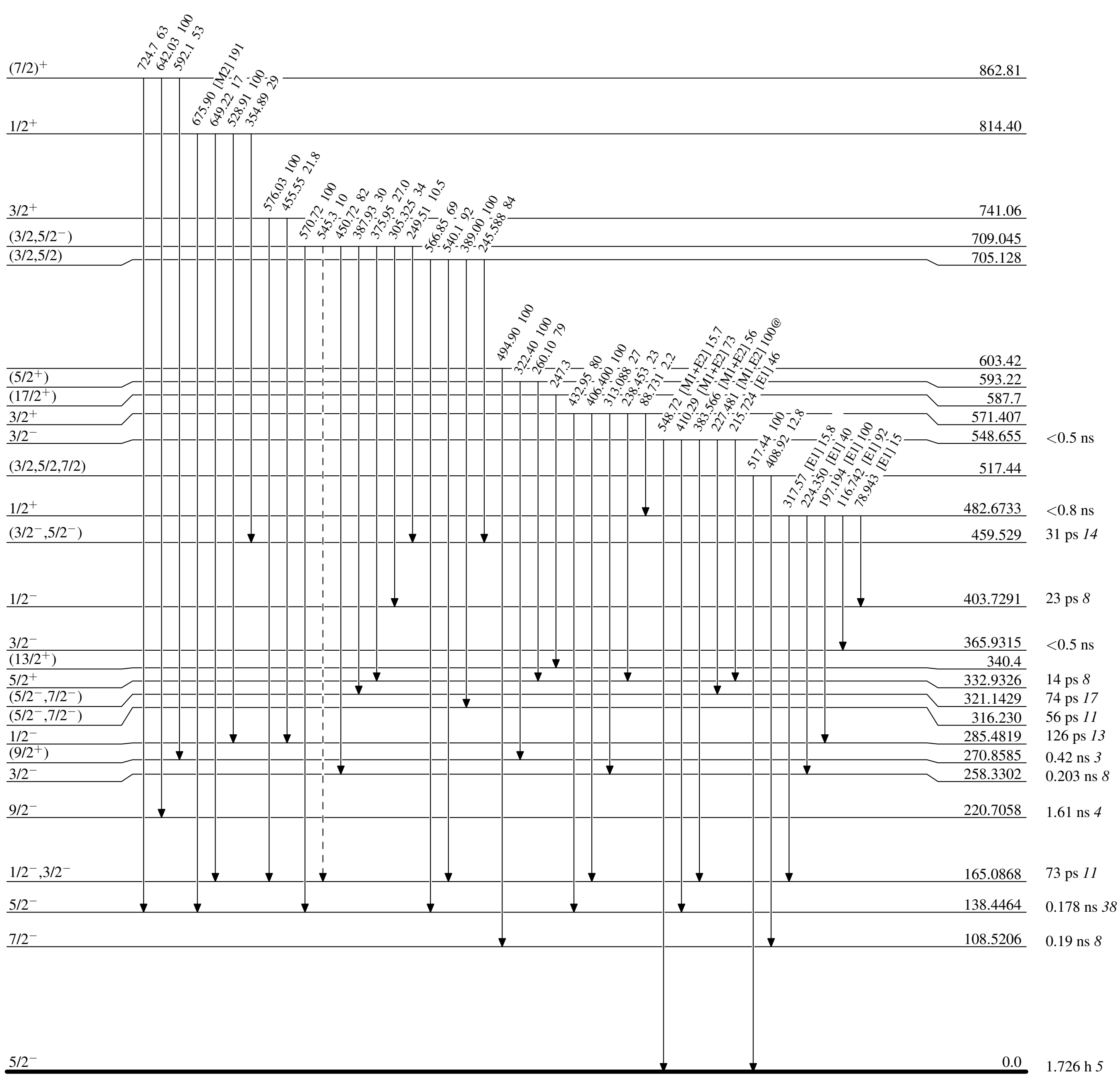
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

γ Decay (Uncertain)



$^{149}_{60}Nd_{89}$

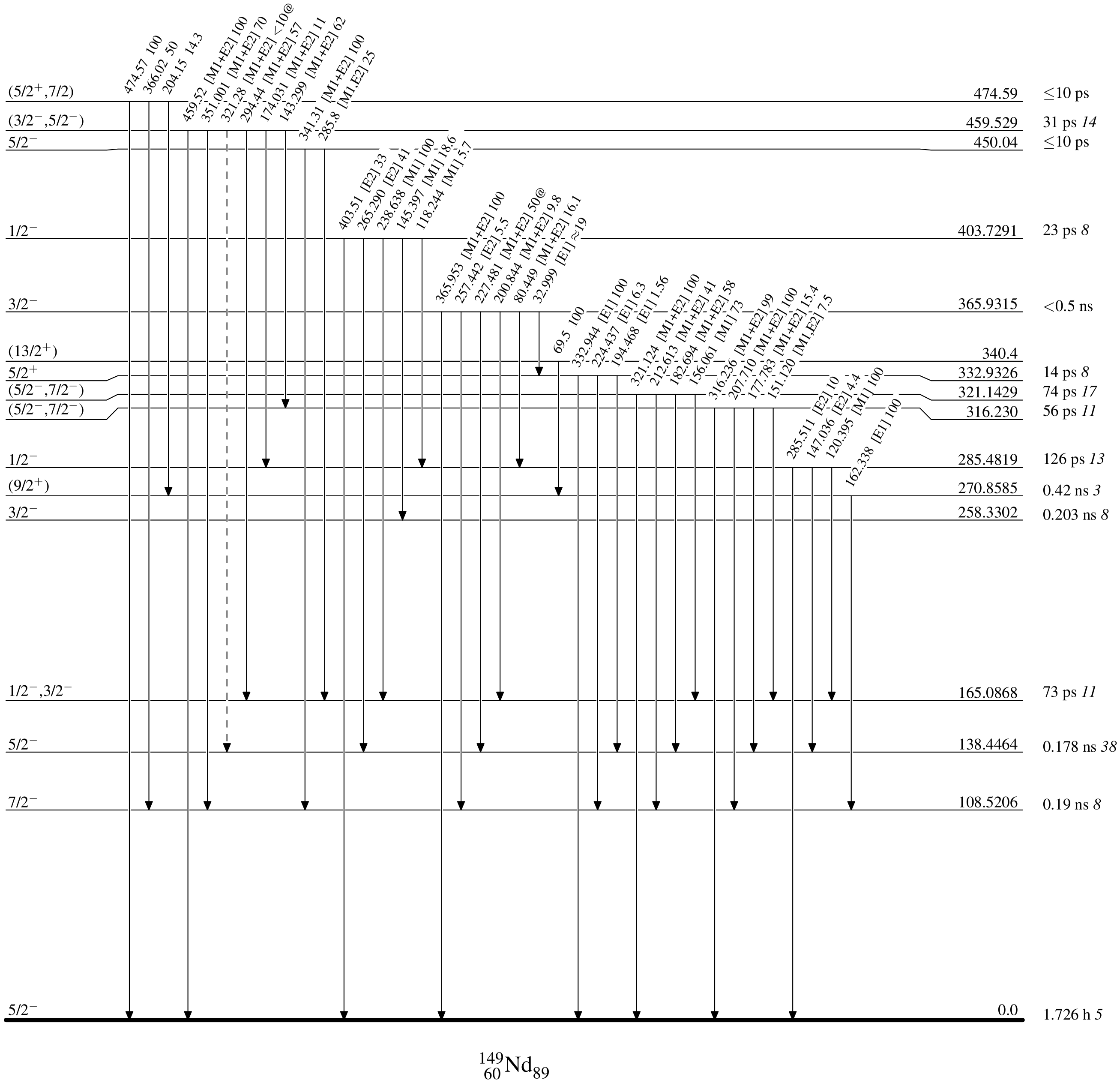
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

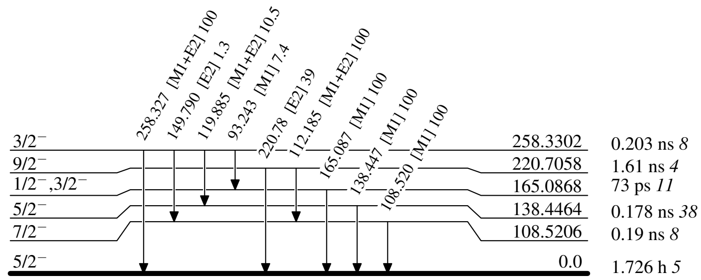
- - - - - -► γ Decay (Uncertain)



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided



$^{149}_{60}Nd_{89}$

Adopted Levels, Gammas