^{142}Nd(γ,γ') 2006Vo11,1990Pi04,1978Me16

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	T. D. Johnson, D. Symochko(a), M. Fadil(b), and J. K. Tuli	NDS 112, 1949 (2011)	1-Jun-2010

Data from 2006Vo11, except where otherwise noted.

E=7.6, 9.9 MeV, bremsstrahlung beam. Measured Eγ, Iγ, $\gamma(\theta)$, cross sections, deduced widths. γ rays detectors with two Compton-suppressed HPGe detectors, placed at 90° and 130° relative to the beam axis.

^{142}Nd Levels

E(level)	J$^\pi$	$T_{1/2}$ †	Γ_0^2/Γ (eV)	Comments
0.0	0^+			
1575.2‡ *7*	2^+	0.114 ps *9*	0.004 *3*	$\Gamma(0)$=3.9 meV *10*, $\Gamma(0)/\Gamma$=100% (1990Pi04).
2216.1 *13*	0^+			
2384.4‡ *11*	2^+	0.14 ps *3*	0.0024 *4*	$T_{1/2}$: from $\Gamma(0)^2/\Gamma$=2.4 *4*. $\Gamma(0)$=2.0 meV *3*, $\Gamma(0)/\Gamma$=100% 10 (1990Pi04).
2583.1‡ *9*	$1^{(+)}$	>0.17 ps	0.0006 *7*	$\Gamma(0)$=1.1 meV *4*, $\Gamma(0)/\Gamma$=100% 20 (1990Pi04). E(level): E from 1973Ra01.
2846.0‡ *20*	2^+	34 fs *7*	0.0115 *10*	$\Gamma(0)$=8.9 meV *13*, $\Gamma(0)/\Gamma$=100% 10 (1990Pi04).
3046.0# *20*	$(2)^+$	≤0.23 ps	0.0014 *6*	
3128‡	1			$\Gamma(0)$=5.7 meV *62*, $\Gamma(0)/\Gamma$=33% 33 (1990Pi04).
3424.2 *5*	1^-	1.55 fs *23*	0.30 *4*	J$^\pi$: π from linear pol (1990He03) Asymmetry ratio of −9.0 (5.6). Γ_0^2/Γ = 295 meV *44* (2006Vo11). $\Gamma(0)$=228 meV *34*, $\Gamma(0)/\Gamma$=100% 10 (1990Pi04). B(E1)(↑)=21×10^{-5} *3*.
3582.1 *13*	(0)			(1974Te01).
4093.9 *6*	$1^{(+)}$	4.1 fs *6*	0.112 *17*	B(E1)(↑)=4.7×10^{-5} *7*. Polarization asymmetry ratio −2.1 (4.2) from (1978Me16). Positive parity also suggested by systematic comparison with ^{144}Sm.
4145.0 *6*	$1^{(-)}$	3.4 fs *5*	0.136 *21*	B(E1)(↑)=5.5×10^{-5} *9*.
4255 *4*	$1,2^+$		0.020 *7*	Observed in (1978Me16). Γ_0^2/Γ (eV): corresponds to J=1.
4625.7 *7*	1	4.7 fs *8*	0.097 *16*	B(E1)(↑)=2.8×10^{-5} *5*.
4901.5 *10*	1	5.8 fs *10*	0.078 *14*	B(E1)(↑)=1.9×10^{-5} *3*.
5164.5 *9*	1	7.4 fs *14*	0.062 *12*	B(E1)(↑)=1.3×10^{-5} *3*.
5219.6 *8*	1	2.2 fs *3*	0.21 *3*	B(E1)(↑)=4.2×10^{-5} *7*.
5381.7 *10*	1	6.6 fs *15*	0.069 *16*	B(E1)(↑)=1.3×10^{-5} *3*.
5412.8 *7*	1	3.2 fs *6*	0.141 *24*	B(E1)(↑)=2.6×10^{-5} *4*.
5432.8 *7*	1	3.3 fs *5*	0.139 *23*	B(E1)(↑)=2.5×10^{-5} *4*.
5523.3 *7*	1	1.0 fs *15*	0.46 *7*	B(E1)(↑)=7.8×10^{-5} *12*.
5551.2 *8*	1	2.9 fs *5*	0.16 *3*	B(E1)(↑)=2.6×10^{-5} *5*.
5586.8 *12*	1	4.3 fs *9*	0.107 *22*	B(E1)(↑)=1.8×10^{-5} *4*.
5660.7 *13*	1	3.0 fs *6*	0.15 *3*	B(E1)(↑)=2.4×10^{-5} *5*.
5713.9 *14*	1	3.7 fs *7*	0.124 *25*	B(E1)(↑)=1.9×10^{-5} *4*.
5733.1 *11*	1	3.4 fs *7*	0.14 *3*	B(E1)(↑)=2.1×10^{-5} *4*.
5824.6 *8*	1	1.9 fs *3*	0.24 *4*	B(E1)(↑)=3.4×10^{-5} *6*.
5862.7 *13*	1	3.4 fs *7*	0.14 *3*	B(E1)(↑)=1.9×10^{-5} *4*.
5912.3 *7*	1	0.88 fs *14*	0.52 *8*	B(E1)(↑)=7.2×10^{-5} *11*.
5956.2 *9*	1	4.5 fs *10*	0.101 *23*	B(E1)(↑)=1.4×10^{-5} *3*.
5995.9 *8*	1	1.50 fs *24*	0.31 *5*	B(E1)(↑)=4.1×10^{-5} *7*.
6016.1 *8*	1	1.45 fs *23*	0.32 *5*	B(E1)(↑)=4.2×10^{-5} *7*.
6034.9 *7*	1	0.89 fs *14*	0.51 *8*	B(E1)(↑)=6.7×10^{-5} *10*.
6047.5 *8*	1	1.48 fs *24*	0.31 *5*	B(E1)(↑)=4.0×10^{-5} *7*.

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^{142}Nd(γ,γ') 2006Vo11,1990Pi04,1978Me16 (continued)

^{142}Nd Levels (continued)

E(level)	J^π	$T_{1/2}$ †	Γ_0^2/Γ (eV)	Comments
6149.7 *7*	1	0.52 fs *8*	0.87 *13*	B(E1)(↑)=10.7×10^{-5} *17*.
6171.5 *7*	1	0.52 fs *8*	0.87 *13*	B(E1)(↑)=10.7×10^{-5} *16*.
6223.8 *8*	1	0.85 fs *13*	0.54 *9*	B(E1)(↑)=6.4×10^{-5} *10*.
6322.4 *6*	1	0.36 fs *5*	1.27 *19*	B(E1)(↑)=14.4×10^{-5} *22*.
6364.0 *11*	1	0.51 fs *8*	0.89 *14*	B(E1)(↑)=9.9×10^{-5} *16*.
6555.3 *10*	1	2.0 fs *4*	0.23 *4*	B(E1)(↑)=2.4×10^{-5} *5*.
6562.4 *7*	1	1.07 fs *18*	0.43 *7*	B(E1)(↑)=4.3×10^{-5} *7*.
6586.9 *11*	1	1.22 fs *23*	0.37 *7*	B(E1)(↑)=3.8×10^{-5} *7*.
6596.5 *11*	1	1.18 fs *21*	0.39 *7*	B(E1)(↑)=3.9×10^{-5} *7*.
6615.5 *13*	1	1.8 fs *4*	0.26 *5*	B(E1)(↑)=2.6×10^{-5} *5*.
6626.0 *10*	1	0.96 fs *17*	0.48 *8*	B(E1)(↑)=4.7×10^{-5} *8*.
6652.9 *12*	1	2.2 fs *5*	0.21 *5*	B(E1)(↑)=2.0×10^{-5} *4*.
6678.2 *9*	1	1.23 fs *21*	0.37 *7*	B(E1)(↑)=3.6×10^{-5} *6*.
6733.6 *10*	1	0.89 fs *15*	0.51 *9*	B(E1)(↑)=4.8×10^{-5} *8*.
6802.6 *10*	1	1.23 fs *22*	0.37 *7*	B(E1)(↑)=3.4×10^{-5} *6*.
6877.2 *9*	1$^-$	1.34 fs *16*		$T_{1/2}$: from Γ(γ)=0.34 eV *4*; Γ(0)/Γ≤0.84 (1974Te01). J^π from angular distribution and polarization (1974Te01).
6932.0 *13*	1	1.6 fs *3*	0.28 *6*	B(E1)(↑)=2.4×10^{-5} *5*.
7068.7 *8*	1	0.42 fs *7*	1.08 *17*	B(E1)(↑)=8.7×10^{-5} *14*.
7113.8 *9*	1	0.56 fs *9*	0.82 *14*	B(E1)(↑)=6.5×10^{-5} *11*.

† Deduced from Γ_0^2/Γ values in 2006Vo11, when available, assuming $\Gamma_0=\Gamma$ based on the observation of only the ground-state transitions. As no transitions other than those to the ground-state were observed, it is a reasonable approximation. B(E1)(↑) values from 2006Vo11. Linear polarization measurements from 1990He03.

‡ Observed in 1990Pi04 but not in 2006Vo11.

Observed in 1978Me16.

γ(^{142}Nd)

E_γ	I_γ #	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α @	Comments
809		2384.4	2$^+$	1575.2	2$^+$			
1576 *2*		1575.2	2$^+$	0.0	0$^+$			
1849‡	<10‡	3424.2	1$^-$	1575.2	2$^+$			
2385 *2*		2384.4	2$^+$	0.0	0$^+$			
2583		2583.1	1$^{(+)}$	0.0	0$^+$			
2846 *2*		2846.0	2$^+$	0.0	0$^+$			
3046 *2*		3046.0	(2)$^+$	0.0	0$^+$			
3295	8	6877.2	1$^-$	3582.1	(0)			
3424.2 *5*		3424.2	1$^-$	0.0	0$^+$			
4093.7 *6*		4093.9	1$^{(+)}$	0.0	0$^+$	(M1)†	0.001462 *21*	α=0.001462 *21*; α(K)=0.0001377 *20*; α(L)=1.728×10^{-5} *25*; α(M)=3.63×10^{-6} *5*; α(N+..)=0.001303 α(N)=8.13×10^{-7} *12*; α(O)=1.244×10^{-7} *18*; α(P)=8.45×10^{-9} *12*; α(IPF)=0.001302 *19*
4144.9 *6*		4145.0	1$^{(-)}$	0.0	0$^+$	(E1)	0.00180 *3*	α=0.00180 *3*; α(K)=8.37×10^{-5} *12*; α(L)=1.023×10^{-5} *15*; α(M)=2.14×10^{-6} *3*; α(N+..)=0.001701 *24*

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^{142}Nd(γ,γ') 2006Vo11,1990Pi04,1978Me16 (continued)

$\gamma(^{142}Nd)$ (continued)

E_γ	I_γ [#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
							α(N)=4.79×10^{-7} *7*; α(O)=7.33×10^{-8} *11*; α(P)=4.97×10^{-9} *7*; α(IPF)=0.001700 *24* POL=+8.9 (4.8) (1978Me16).
4255 *4*		4255	1,2$^+$	0.0	0$^+$		
4294	8	6877.2	1$^-$	2583.1	1$^{(+)}$		
4625.6 *7*		4625.7	1	0.0	0$^+$		
4661	3	6877.2	1$^-$	2216.1	0$^+$		
4901.4 *10*		4901.5	1	0.0	0$^+$		
5164.4 *9*		5164.5	1	0.0	0$^+$		
5219.5 *8*		5219.6	1	0.0	0$^+$		
5381.6 *10*		5381.7	1	0.0	0$^+$		
5412.7 *7*		5412.8	1	0.0	0$^+$		
5432.7 *7*		5432.8	1	0.0	0$^+$		
5523.2 *7*		5523.3	1	0.0	0$^+$		
5551.1 *8*		5551.2	1	0.0	0$^+$		
5586.7 *12*		5586.8	1	0.0	0$^+$		
5660.6 *13*		5660.7	1	0.0	0$^+$		
5713.8 *14*		5713.9	1	0.0	0$^+$		
5733.0 *11*		5733.1	1	0.0	0$^+$		
5824.5 *8*		5824.6	1	0.0	0$^+$		
5862.6 *13*		5862.7	1	0.0	0$^+$		
5912.2 *7*		5912.3	1	0.0	0$^+$		
5956.1 *9*		5956.2	1	0.0	0$^+$		
5995.8 *8*		5995.9	1	0.0	0$^+$		
6016.0 *8*		6016.1	1	0.0	0$^+$		
6034.8 *7*		6034.9	1	0.0	0$^+$		
6047.4 *8*		6047.5	1	0.0	0$^+$		
6149.6 *7*		6149.7	1	0.0	0$^+$		
6171.4 *7*		6171.5	1	0.0	0$^+$		
6223.7 *8*		6223.8	1	0.0	0$^+$		
6322.2 *6*		6322.4	1	0.0	0$^+$		
6363.8 *11*		6364.0	1	0.0	0$^+$		
6555.1 *10*		6555.3	1	0.0	0$^+$		
6562.2 *7*		6562.4	1	0.0	0$^+$		
6586.7 *11*		6586.9	1	0.0	0$^+$		
6596.3 *11*		6596.5	1	0.0	0$^+$		
6615.3 *13*		6615.5	1	0.0	0$^+$		
6625.8 *10*		6626.0	1	0.0	0$^+$		
6652.7 *12*		6652.9	1	0.0	0$^+$		
6678.0 *9*		6678.2	1	0.0	0$^+$		
6733.4 *10*		6733.6	1	0.0	0$^+$		
6802.4 *10*		6802.6	1	0.0	0$^+$		
6877	100	6877.2	1$^-$	0.0	0$^+$	E1	α(IPF)=0.00251 *4* A_2=0.51 (2) pol=1.10 (4).
6931.8 *13*		6932.0	1	0.0	0$^+$		
7068.5 *8*		7068.7	1	0.0	0$^+$		
7113.6 *9*		7113.8	1	0.0	0$^+$		

† From linear polarization and $\gamma(\theta)$ (1978Me16).
‡ Not observed, Eγ from level energy difference.
# Branching from each level.
@ 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.

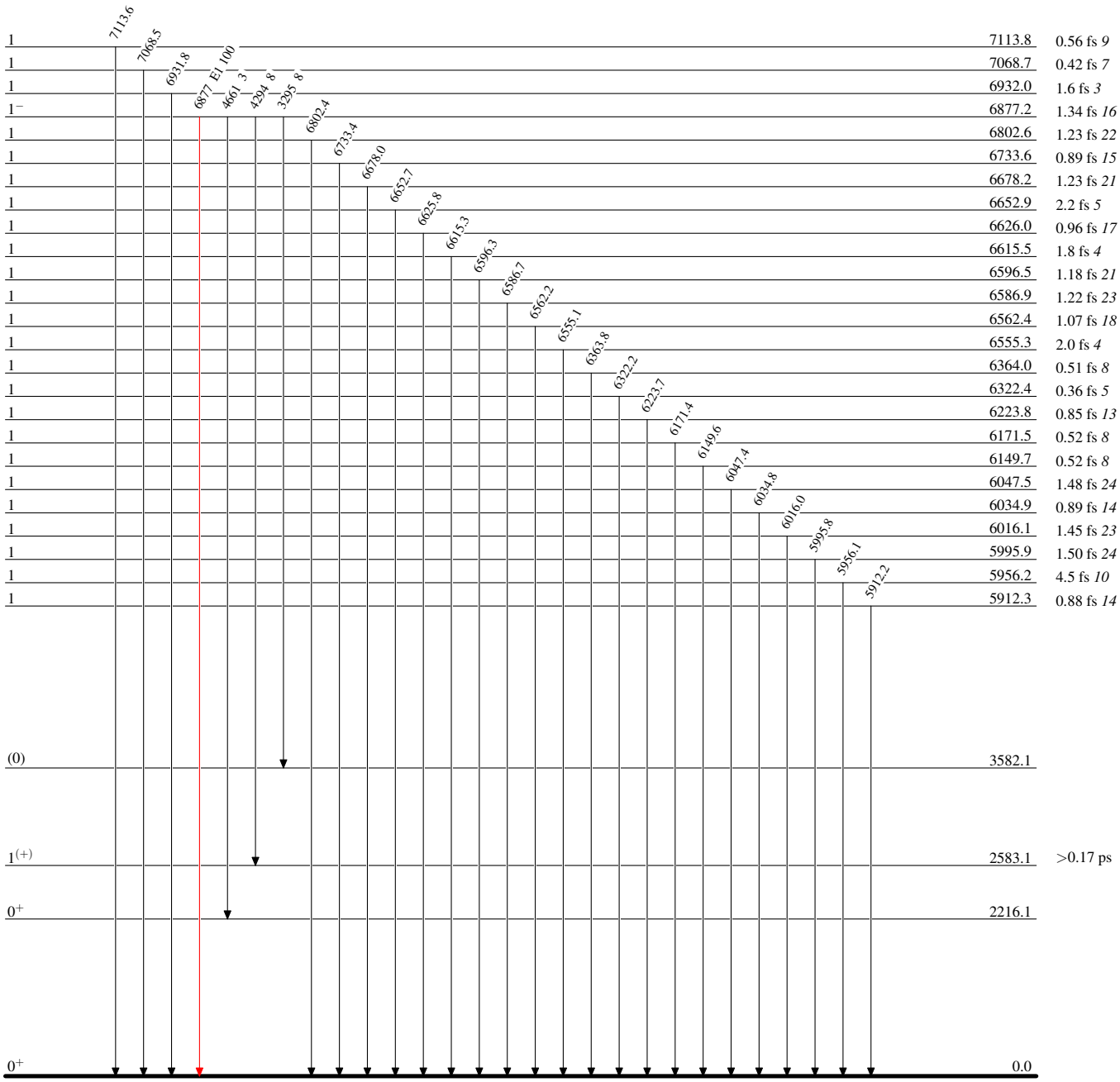
^{142}Nd(γ,γ′) 2006Vo11,1990Pi04,1978Me16

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$

Level Scheme

Intensities: Type not specified

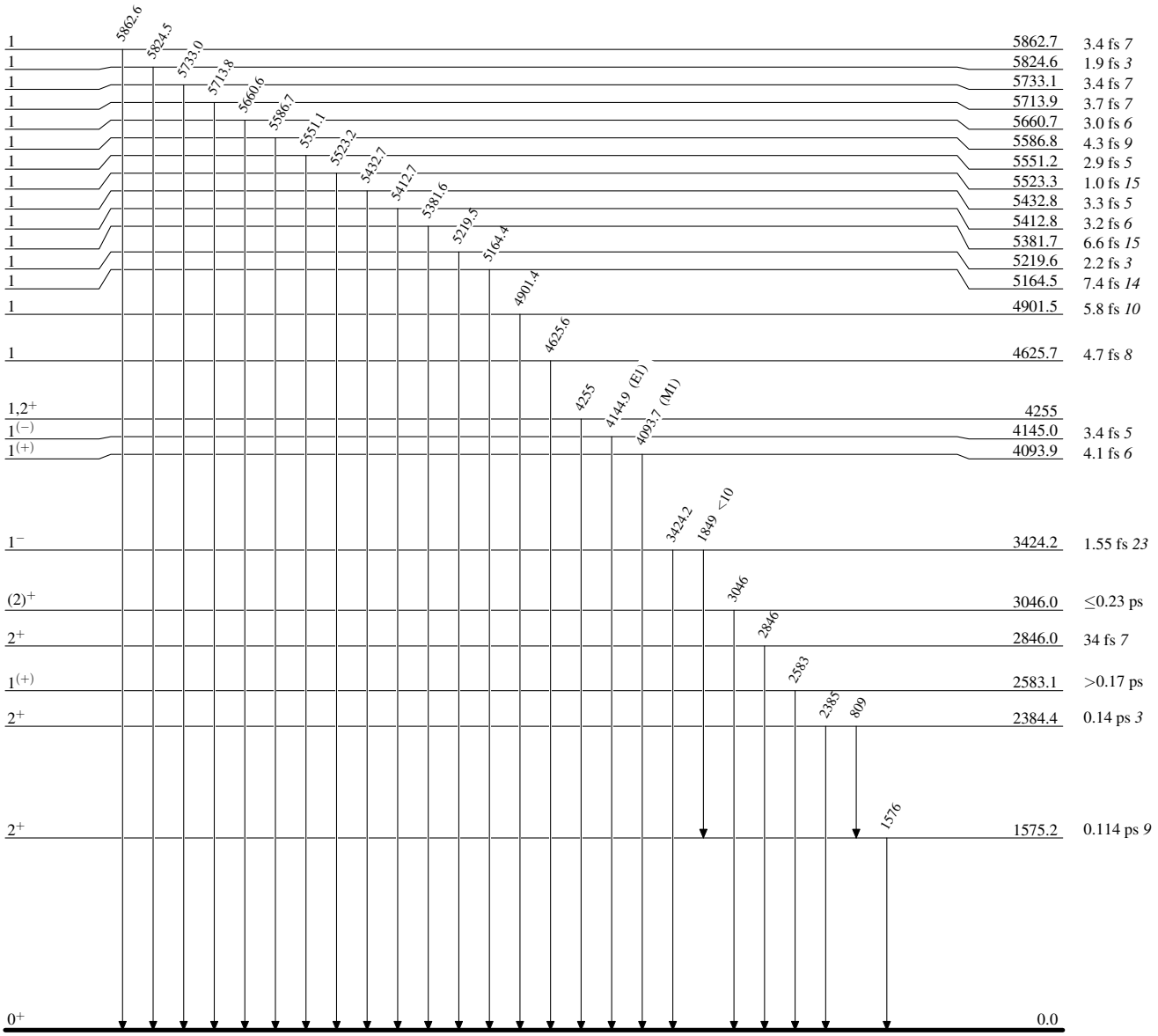


$^{142}_{60}Nd_{82}$

^{142}Nd(γ,γ′) 2006Vo11,1990Pi04,1978Me16

Level Scheme (continued)

Intensities: Type not specified



$^{142}_{60}Nd_{82}$