^{150}Nd(^{48}Ca,4nγ) 1996Fo01,1996Kr13,1994Ce04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 177, 1 (2021)	3-Sep-2021

Normal-deformed data:

1996Fo01: ^{150}Nd(^{48}Ca,4nγ) E=213 MeV. Measured Eγ, Iγ, $\gamma\gamma$ coin, $\gamma\gamma(\theta)$ (DCO at θ=90°, 158°) using EUROGAM array of 35 Compton-suppressed Ge detectors. Two possible dipole (ΔJ=1) bands deduced based on experimental B(M1)/B(E2) ratios.

1999We02: ^{150}Nd(^{48}Ca,4nγ) E=203 MeV. Measured time-decay histories of normal-deformed bands by DSA technique for lifetimes.

Superdeformed structure data:

1990Ri05 (also 1990Cu06): ^{150}Nd(^{48}Ca,4nγ) E=205 MeV. Measured $\gamma\gamma$, deduced superdeformed bands.

1990Be11 (also 1990St12,1990He09): ^{150}Nd(^{48}Ca,4nγ) E=195-210 MeV. Measured $\gamma\gamma$, $\gamma\gamma\gamma$; deduced superdeformed bands.

1994Ce04, 1994Hu05: ^{150}Nd(^{48}Ca,4nγ) E=205 MeV. Measured $T_{1/2}$ by DSAM for several transitions in SD-1 and SD-3 bands.

1996Kh04: ^{150}Nd(^{48}Ca,4nγ) E=195 MeV. Measured Eγ, Iγ, $\gamma\gamma\gamma$ using GAMMASPHERE array (55 Compton-suppressed Ge detectors). Four γ rays (3489,3710,4195,4485) reported to connect lower SD-1 band members to normal deformed states through single-step transitions.

1996Kr13: ^{150}Nd(^{48}Ca,4nγ) E=201 MeV. Measured Eγ, Iγ, $\gamma\gamma\gamma$ for SD bands using EUROGAM array of 70 HPGe detectors.

1997Ha49: ^{150}Nd(^{48}Ca,4nγ) E=202 MeV. Measured Eγ, Iγ, $\gamma\gamma\gamma$ using GAMMASPHERE array (85 and 92 Compton-suppressed Ge detectors). Two γ rays (4978 and 5030) reported to connect lower SD-3 band members to normal deformed states through single-step transitions and several transitions connecting SD-1 band members. See also 1998Ch16 and 1998Ha26 as related comments to this work.

1997Ku03: ^{150}Nd(^{48}Ca,4nγ) E=209 MeV. Measured $T_{1/2}$ by recoil-distance Doppler shift method for SD states in SD-1 band, using GASP array of 40 HPGe detectors.

1997Mo12 (also 1997Mo22): ^{150}Nd(^{48}Ca,4nγ) E=202 MeV. Measured lifetimes by DSAM for three SD bands, using GAMMASPHERE array, deduced Q(intrinsic).

1997Ka34: ^{186}W(^{16}O,α4nγ) E=110 MeV. Measured production yields in incomplete fusion.

1999We04 (also 1998Ma71,1998We23): ^{150}Nd(^{48}Ca,4nγ) E=203 MeV. Measured average g factors of three SD bands by hyperfine interactions in a transient field ($\gamma(\theta$,H,t) method).

1999Lo02: analyzed $\gamma\gamma$ coin data for decay out primary transitions from SD bands. Deduced strength distribution of γ transitions.

1999Ca25 (also 1999Ca22): ^{164}Dy(^{30}Si,Xγ) E=142 MeV. Measured high-energy γ rays from ^{194}Hg compound nucleus. Deduced GDR features.

2001De42: ^{150}Nd(^{48}Ca,4nγ) E=210 MeV. Measured lifetimes of SD band members by recoil-distance method using Gammasphere array with 97 large volume Compton-suppressed Ge detectors.

2001Kr22, 2004KhZX, 2005DoZZ: Estimates of spreading widths for decay out of SD bands.

2008Lo01: E=201 MeV beam at LBNL. Measured Eγ, Iγ, $\gamma\gamma$ coin using GAMMASPHERE array. Investigated ridges in the $\gamma\gamma$ coincidence spectra, and found experimental evidence for 100-150 SD bands that contribute to narrow ridges ($\approx$10 keV) formed by E2 strength over a gamma-ray energy region of 650-900 keV.

Analysis of SD band data: 2004Lo06, 2000La31, 1999Lo21, 1999Lo02, 1997La36, 1997Fa15.

Spreading width, decay out-features calculated: 2005Wi04.

^{194}Hg Levels

Average g factor of three SD bands=+0.41 *8* (1999We04).

E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡
0.0	0$^+$	2138.0 *5*	8$^-$	2687.8 *5*	(11$^-$)	3747.8 *5*	(14$^-$)
427.90 *20*	2$^+$	2143.4 *4*	9$^-$	2888.4 *5*	(14$^+$)	3820.4 *5*	(15$^-$)
1064.5 *3*	4$^+$	2364.2 *4*	(8$^+$)	3063.8? *7*		3879.3 *6*	(15$^-$)
1799.2 *4*	6$^+$	2423.5 *4*	(10$^+$)	3173.1 *5*	(12$^-$)	3984.1 *5*	(16$^-$)
1813.4 *4*	5$^-$	2475.5 *5*	(12$^+$)	3394.0 *5*	(13$^-$)	4005.0 *8*	(15$^-$)
1910.4 *4*	7$^-$	2561.9 *5*	(10$^-$)	3531.6 *5*	(16$^+$)	4015.1 *5*	(14$^+$)

Continued on next page (footnotes at end of table)

^{150}Nd(^{48}Ca,4nγ) 1996Fo01,1996Kr13,1994Ce04 (continued)

^{194}Hg Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	Comments
4114.8 *5*	(17⁻)		
4275.3 *6*	(18⁺)		
4290.0 *6*	(18⁻)		
4317.7 *6*	(16⁺)		
4491.8 *6*	(17⁻)		
4497.9 *6*	(19⁻)		
4521.3 *6*	(17⁻)		
4797.8 *6*	(18⁺)		
4896.8 *6*	(20⁻)		
4985.7 *6*	(20⁺)		
5103.7 *6*	(19⁻)		
5163.8 *6*	(21⁻)		
5266.2 *7*	(20⁺)		
5391.9 *6*			
5493.7 *6*			
5523.3 *6*	(20⁺)		
5578.3 *6*	(22⁺)		
5610.4 *6*	(21⁻)		
5700.4 *7*	(22⁻)		
6013.4 *7*			
6032.8 *6*	(22⁺)		
6049.9 *6*	(23⁻)		
6120.2 *6*	(23⁻)		
6256.5 *7*			
6349.9 *7*	(22⁺)		
6410.7 *6*	(24⁺)		
6417.3[@] *6*	(8⁺)		
6455.2 *8*			
6629.0[@] *5*	(10⁺)		≈94% of the decay is through unresolved multi-step statistical decays (1997Ha49).
6645.6 *8*	(24⁻)		
6675.6 *6*	(22⁺)		
6777.1 *8*			
6790.6 *6*			
6815.7 *6*	(25⁻)		
6833.9 *6*	(24⁺)		
6883.0[@] *5*	(12⁺)	2.4 ps *4*	$T_{1/2}$: from 2001De42. Other: 1.9 ps *7* (RDDS,1997Ku03). Deduced Q(intrinsic)=18.1 *+25−19* (2001De42), 20 *+5−3* (1997Ku03). 1997Ku03 quote $T_{1/2}$=0.77 ps *26* from another study (reference 15 in 1997Ku03). ≈42% of the decay is through unresolved multi-step statistical decays (1997Ha49).
6941.8 *7*	(25⁻)		
6989.0 *6*	(26⁺)		
7179.0[@] *5*	(14⁺)	2.1 ps *4*	$T_{1/2}$: from 2001De42. Other: 2.3 ps *4* (RDDS,1997Ku03). Deduced Q(intrinsic)=17.6 *+20−15* (2001De42), 16.8 *+17−13* (1997Ku03). 1997Ku03 quote $T_{1/2}$=1.46 ps *30* from another study (reference 15 in 1997Ku03).
7231.3[a] *11*	(9⁻)		
7263.0 *6*			
7303.7 *7*	(28⁺)		
7453.3[a] *5*	(11⁻)		≈91% of the decay is through unresolved multi-step statistical decays (1997Ha49).
7516.1[@] *5*	(16⁺)	1.36 ps *17*	$T_{1/2}$: from 2001De42. Other: 1.0 ps *3* (RDDS,1997Ku03). Deduced Q(intrinsic)=15.9 *+12−10* (2001De42), 18.3 *+34−22* (1997Ku03). 1997Ku03 quote $T_{1/2}$=0.78 ps *14* from another study (reference 15 in 1997Ku03).
7555.5 *7*	(27⁻)		
7582.0 *6*			
7588.1 *7*	(27⁻)		

Continued on next page (footnotes at end of table)

^{150}Nd(^{48}Ca,4nγ) 1996Fo01,1996Kr13,1994Ce04 (continued)

^{194}Hg Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	$T_{1/2}$[#]	Comments
7715.5[a] *5*	(13⁻)	2.1 ps *7*	$T_{1/2}$: from 2001De42. Deduced Q(transition)=22.0 *+59−35*.
7768.4 *8*	(27)		
7784.0 *8*	(30⁺)		
7893.5[@] *5*	(18⁺)		
7941.8 *6*			
8018.2[a] *5*	(15⁻)	2.1 ps *6*	$T_{1/2}$: from 2001De42. Deduced Q(transition)=16.9 *+39−25*.
8287.2 *7*			
8310.1[@] *5*	(20⁺)		
8360.7[a] *5*	(17⁻)	1.4 ps *5*	$T_{1/2}$: from 2001De42. Deduced Q(transition)=14.8 *+40−24*.
8561.6 *7*	(29⁻)		
8664.8 *7*			
8742.4[a] *5*	(19⁻)		
8764.9[@] *5*	(22⁺)	0.27 ps *6*	Q(transition)=17.3 *+25−17* (1994Hu05).
9068.2 *7*	(30)		
9162.5[a] *5*	(21⁻)		
9256.7[@] *5*	(24⁺)	0.166 ps *22*	Q(transition)=18.1 *+13−11* (1994Hu05).
9500.4 *7*			
9564.8 *8*	(31⁻)		
9591.3 *9*	(31⁻)		
9620.3[a] *5*	(23⁻)		
9784.6[@] *5*	(26⁺)	0.120 ps *25*	Q(transition)=17.8 *+22−16* (1994Hu05).
9881.7 *9*	(32)		
9933.0 *8*	(32)		
10115.0[a] *5*	(25⁻)		
10225.4 *9*	(33)		
10347.5[@] *5*	(28⁺)	0.114 ps *39*	Q(transition)=15.6 *+36−21* (1994Hu05).
10603.3 *10*	(34)		
10646.0[a] *5*	(27⁻)		
10944.4[@] *5*	(30⁺)	0.078 ps *17*	Q(transition)=16.3 *+22−16* (1994Hu05).
11012.2 *10*	(35)		
11212.3[a] *5*	(29⁻)		
11574.3[@] *5*	(32⁺)	0.060 ps *21*	Q(transition)=16.1 *+40−23* (1994Hu05).
11813.2[a] *5*	(31⁻)		
12236.4[@] *5*	(34⁺)	0.042 ps *13*	Q(transition)=17.2 *+36−22* (1994Hu05).
12447.8[a] *5*	(33⁻)		
12929.8[@] *5*	(36⁺)	0.026 ps *11*	Q(transition)=19.5 *+64−32* (1994Hu05).
13115.7[a] *6*	(35⁻)		
13653.7[@] *5*	(38⁺)		
13815.8[a] *6*	(37⁻)		
14407.7[@] *5*	(40⁺)		
14547.5[a] *6*	(39⁻)		
15191.3[@] *5*	(42⁺)		
15310.3[a] *6*	(41⁻)		
16004.4[@] *5*	(44⁺)		
16103.8[a] *6*	(43⁻)		
16847.0[@] *5*	(46⁺)		
16927.4[a] *6*	(45⁻)		
17719.4[@] *5*	(48⁺)		
17781.3[a] *6*	(47⁻)		
18622.5[@] *6*	(50⁺)		

Continued on next page (footnotes at end of table)

^{150}Nd(^{48}Ca,4nγ) 1996Fo01,1996Kr13,1994Ce04 (continued)

^{194}Hg Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	Comments
18664.9[a] *7*	(49⁻)		
x[&]	J≈(8)		Additional information 1.
200.79+x[&] *6*	J+2		
443.04+x[&] *9*	J+4	3.0 ps *8*	$T_{1/2}$: from 2001De42. Deduced Q(transition)=20.8 *+45−30*.
726.18+x[&] *11*	J+6	2.7 ps *6*	$T_{1/2}$: from 2001De42. Deduced Q(transition)=17.4 *+26−18*.
1049.63+x[&] *12*	J+8	1.3 ps *5*	$T_{1/2}$: from 2001De42. Deduced Q(transition)=18.1 *+54−29*.
1412.75+x[&] *14*	J+10		
1814.80+x[&] *15*	J+12		
2255.11+x[&] *16*	J+14	0.27 ps *9*	Q(transition)=19.0 *+43−26* (1994Hu05).
2732.79+x[&] *17*	J+16	0.20 ps *5*	Q(transition)=17.9 *+26−18* (1994Hu05).
3247.02+x[&] *18*	J+18	0.13 ps *5*	Q(transition)=18.5 *+55−29* (1994Hu05).
3796.95+x[&] *19*	J+20	0.100 ps *33*	Q(transition)=17.7 *+39−23* (1994Hu05).
4381.78+x[&] *20*	J+22	0.089 ps *19*	Q(transition)=16.1 *+21−15* (1994Hu05).
5000.74+x[&] *21*	J+24	0.065 ps *28*	Q(transition)=16.3 *+54−27* (1994Hu05).
5652.77+x[&] *22*	J+26		
6337.34+x[&] *23*	J+28		
7053.54+x[&] *24*	J+30		
7800.4+x[&] *3*	J+32		
8578.2+x[&] *3*	J+34		
9385.9+x[&] *4*	J+36		
10223.4+x[&] *4*	J+38		
11090.5+x[&] *4*	J+40		

† From a least-squares fit to γ-ray energies, assuming $\Delta E\gamma$=0.3 keV for values quoted to tenth keV and 1 keV for those quoted to one keV if not given.

‡ From Adopted Levels. Assignments are supported by $\gamma\gamma$(DCO) data of 1996Fo01 as given under comments where available as well as by band assignments. For superdeformed bands, the adopted assignments are from least-squares fit of Eγ data to empirical formulas based on rotational model (1992Wu01,1990Be37,1990Dr08). Stretched quadrupole (E2) transitions are assumed within a SD band as indicated by some $\gamma\gamma(\theta)$ (DCO) data. For SD-1 band, connecting transitions (1996Kh04) confirm the given assignments.

For SD bands, values are from DSAM method (1994Hu05,1994Ce04).

@ Band(A): SD-1 band. Band from 1996Kr13, 1994Ce04, 1990Ri05, 1990Be11, 1990St12, 1994Hu05, 1996Kh04, 1997Ha49, 1997Ka34, 1997Ku03, 1997Mo12, 1998Ma71, 1999We04, 2000La31, 2001De42. Spins and parities are proposed by 1996Kh04 on the basis of connecting transitions to the normal bands. Average (for the SD band) Q(intrinsic)=16.8 *7* (2001De42), 17.7 *4* (1997Mo12), 17.2 *20* (1994Hu05), 17.3 *15* (1997Ku03). Population of this band is estimated as 7% of the 4⁺ to 2⁺ transition in the normal g.s. band (1990Be11). Average g factor=+0.36 *10* (1999We04).

& Band(B): SD-2 band. Band from 1996Kr13, 1994Ce04, 1990Ri05, 1990Be11, 1997Mo12, 1997Ku03, 1994Hu05, 1998Ma71, 1999We04, 2001De42. Population of this band is estimated as 2% of the 4⁺ to 2⁺ transition in g.s. band (1990Be11). Q(intrinsic)=19.0 *20* (2001De42), 17.6 *6* (1997Mo12), 16.5 *31* (1997Ku03), 17.6 *30* (1994Hu05). Average g factor=+0.41 *20* (1999We04).

a Band(C): SD-3 band. Band from 1996Kr13, 1994Ce04, 1990Ri05, 1990Be11, 1997Mo12, 1997Ku03, 1998Ma71, 1999We04, 2001De42. Q(intrinsic)=18.8 *25* (2001De42), 17.5 *8* (1997Mo12), 15.1 *36* (1997Ku03). Average g factor=+0.72 *26* (1999We04). SD-2 and SD-3 bands are interpreted as signature partners of a 2-quasiparticle (neutrons) excited state band with configuration: 9/2[624]⊗5/2[512] (1990Ri05,1990Be11,1994Ce04).

^{150}Nd(^{48}Ca,4nγ) 1996Fo01,1996Kr13,1994Ce04 (continued)

γ(^{194}Hg)

DCO ratios given under comments are from 1996Fo01 and obtained as R_{DCO}=Iγ1(90°)(gate γ2 at 158°)/Iγ1(158°)(gate γ2 at 90°), with gates on stretched quadrupole transition, unless otherwise noted.

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	$I_{(\gamma+ce)}$[#]	Comments
52.0 2		2475.5	(12$^+$)	2423.5	(10$^+$)			E_γ: from ce data in (α,4nγ) (1983Gu05).
59.5		2423.5	(10$^+$)	2364.2	(8$^+$)			E_γ: from ce data in (α,4nγ) (1983Gu05).
97.0[&]		1910.4	7$^-$	1813.4	5$^-$			
111.0[&]		1910.4	7$^-$	1799.2	6$^+$			
130.8[&]		4114.8	(17$^-$)	3984.1	(16$^-$)			
[x]146[b]								(M1+E2) from Q_2A_2=−0.52 3, Q_4A_4=+0.21 2 (1998We23).
155.1[&]		6989.0	(26$^+$)	6833.9	(24$^+$)			
158.0[&]		6833.9	(24$^+$)	6675.6	(22$^+$)			
200.79 6		200.79+x	J+2	x	J≈(8)		0.36 5	
208.0[&]		4497.9	(19$^-$)	4290.0	(18$^-$)			
211.7		6629.0	(10$^+$)	6417.3	(8$^+$)		0.03	I_γ: ≈0.01 (1997Ha49).
222		7453.3	(11$^-$)	7231.3	(9$^-$)		<0.01	
227.6[&a]		2138.0	8$^-$	1910.4	7$^-$	D+Q[e]		Q_2A_2=−0.80 2, Q_4A_4=+0.13 1 (1998We23).
232.9[@a] 2		2143.4	9$^-$	1910.4	7$^-$	(Q)[e]		Q_2A_2=+0.27 1, Q_4A_4=−0.10 1 (1998We23) for 232.9+235.5.
235.5[@a] 2		4114.8	(17$^-$)	3879.3	(15$^-$)	(E2)[e]		Q_2A_2=+0.27 1, Q_4A_4=−0.10 1 (1998We23) for 232.9+235.5.
236.3[&]		3984.1	(16$^-$)	3747.8	(14$^-$)			
242.25 6		443.04+x	J+4	200.79+x	J+2		0.75 5	
[x]253[b]								(M1+E2) from Q_2A_2=−0.35 2, Q_4A_4=+0.06 2 (1998We23).
253.93 4		6883.0	(12$^+$)	6629.0	(10$^+$)		0.58 3	E_γ: 254.6 (1996Kh04). I_γ: 0.50 (1997Ha49).
262.27 6		7715.5	(13$^-$)	7453.3	(11$^-$)		0.76 5	
[x]265.2[@] 8								
267.3[&]		4015.1	(14$^+$)	3747.8	(14$^-$)			
280.1[@a] 2		2423.5	(10$^+$)	2143.4	9$^-$	D+Q[e]		Q_2A_2=−0.36 5, Q_4A_4=+0.05 4 (1998We23).
283.14 6		726.18+x	J+6	443.04+x	J+4		1.00 5	
290.4 8	16 1	9881.7	(32)	9591.3	(31$^-$)			
295.99 3		7179.0	(14$^+$)	6883.0	(12$^+$)		0.97 3	
302.5[&]		4317.7	(16$^+$)	4015.1	(14$^+$)			
302.68 6		8018.2	(15$^-$)	7715.5	(13$^-$)		0.90 5	
305.9[&a]		4290.0	(18$^-$)	3984.1	(16$^-$)	(E2)[e]		Q_2A_2=+0.30 1, Q_4A_4=−0.06 2 (1998We23).
314.7[&]		7303.7	(28$^+$)	6989.0	(26$^+$)			
[x]315[b]								D+Q from Q_2A_2=−0.49 1, Q_4A_4=+0.04 1 (1998We23).
317.0 4	32 1	9881.7	(32)	9564.8	(31$^-$)	D[d]		DCO=0.56 8
319.1 4	34 1	7582.0		7263.0				
323.45 6		1049.63+x	J+8	726.18+x	J+6		0.97 5	
333.6[&f]		4317.7	(16$^+$)	3984.1	(16$^-$)			
335.3 8	12 1	6790.6		6455.2				
337.18 3		7516.1	(16$^+$)	7179.0	(14$^+$)		0.95 3	
342.50 6		8360.7	(17$^-$)	8018.2	(15$^-$)		0.90 5	

Continued on next page (footnotes at end of table)

^{150}Nd(^{48}Ca,4nγ) 1996Fo01,1996Kr13,1994Ce04 (continued)

γ(^{194}Hg) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	$I_{(\gamma+ce)}$ [#]	Comments
343.6 4	32 2	10225.4	(33)	9881.7	(32)	D[d]		DCO=0.51 10
345.4 2	122 4	8287.2		7941.8		D[d]		DCO=0.53 9
353.6[&]		3747.8	(14⁻)	3394.0	(13⁻)			
359.8 2	115 3	7941.8		7582.0		D[d]		DCO=0.31 9
363.12 6		1412.75+x	J+10	1049.63+x	J+8		1.00 5	
377.39 3		7893.5	(18⁺)	7516.1	(16⁺)		0.97 3	
377.6 4	115 3	8664.8		8287.2		(D)[d]		DCO=0.51 4 DCO for 377.6γ+377.9γ.
377.9 4	22 1	10603.3	(34)	10225.4	(33)	(D)[d]		DCO=0.51 4 DCO for 377.6γ+377.9γ.
381.68 6		8742.4	(19⁻)	8360.7	(17⁻)		0.97 5	
383.0[@] 2		4497.9	(19⁻)	4114.8	(17⁻)			
402.05 6		1814.80+x	J+12	1412.75+x	J+10		1.00 5	
403.5 2	45 3	9068.2	(30)	8664.8				
409.1 8	11 1	11012.2	(35)	10603.3	(34)			
412.9[@a] 2		2888.4	(14⁺)	2475.5	(12⁺)	Q[e]		Q_2A_2=+0.35 1, Q_4A_4=−0.12 1 (1998We23).
416.60 3		8310.1	(20⁺)	7893.5	(18⁺)		1.00 3	
418.5[&]		2561.9	(10⁻)	2143.4	9⁻			
420.08 6		9162.5	(21⁻)	8742.4	(19⁻)		1.00 5	
423.8[&a]		2561.9	(10⁻)	2138.0	8⁻	Q[e]		Q_2A_2=+0.31 1, Q_4A_4=−0.09 1 (1998We23).
427.9[@] 2	100	427.90	2⁺	0.0	0⁺	Q		I_γ: 1996Fo01 state that all intensities are normalized to that of 427.9γ. The authors do not explicitly quote Iγ for 427.9, the evaluators assume that to be 100. Q_2A_2=+0.22 1, Q_4A_4=−0.06 1 (1998We23). Q_2A_2=+0.27 1, Q_4A_4=−0.07 1 (1998We23).
432.1[@] 4		9500.4		9068.2	(30)			
432.6[@] 4		9933.0	(32)	9500.4				
440.31 6		2255.11+x	J+14	1814.80+x	J+12		1.02 5	
441.5 8	12 1	6455.2		6013.4				
454.7 4	39 1	6032.8	(22⁺)	5578.3	(22⁺)			
454.76 3		8764.9	(22⁺)	8310.1	(20⁺)		0.99 3	
457.79 6		9620.3	(23⁻)	9162.5	(21⁻)		0.99 5	
[x]460[b]								D+Q from Q_2A_2=−0.63 2, Q_4A_4=+0.15 2 (1998We23).
472.3 4	27 1	7263.0		6790.6				
477.68 6		2732.79+x	J+16	2255.11+x	J+14		1.01 5	
480.0[&]		4797.8	(18⁺)	4317.7	(16⁺)			
480.3[&]		7784.0	(30⁺)	7303.7	(28⁺)			
485.2[@] 4		3173.1	(12⁻)	2687.8	(11⁻)			
485.2[@a] 4		3879.3	(15⁻)	3394.0	(13⁻)	Q[e]		Q_2A_2=+0.35 1, Q_4A_4=−0.10 2 (1998We23).
491.86 5		9256.7	(24⁺)	8764.9	(22⁺)		1.01 3	
494.77 6		10115.0	(25⁻)	9620.3	(23⁻)		1.02 5	
506.7 2	100 4	5610.4	(21⁻)	5103.7	(19⁻)	Q[c]		DCO=0.93 10
507.5[&]		4797.8	(18⁺)	4290.0	(18⁻)			
509.9 2	108 4	6120.2	(23⁻)	5610.4	(21⁻)	Q[c]		DCO=0.82 10
514.23 6		3247.02+x	J+18	2732.79+x	J+16		1.00 5	
516.3[@] 8		4521.3	(17⁻)	4005.0	(15⁻)			
527.88 3		9784.6	(26⁺)	9256.7	(24⁺)		1.00 3	
531.01 7		10646.0	(27⁻)	10115.0	(25⁻)		1.04 5	
[x]532[b]								dipole from Q_2A_2=−0.15 2, Q_4A_4=+0.05 3 (1998We23).

Continued on next page (footnotes at end of table)

^{150}Nd(^{48}Ca,4nγ) 1996Fo01,1996Kr13,1994Ce04 (continued)

γ(^{194}Hg) (continued)

Eγ[†]	Iγ[‡]	Ei(level)	J_i^π	E_f	J_f^π	Mult.	$I_{(\gamma+ce)}$[#]	Comments
538.9 4	24 1	6032.8	(22+)	5493.7				
541.9[f] 4	31 3	6120.2	(23−)	5578.3	(22+)			
544.6[@a] 4		2687.8	(11−)	2143.4	9−	Q[e]		Q_2A_2=+0.35 1, Q_4A_4=−0.12 1 (1998We23).
549.93 6		3796.95+x	J+20	3247.02+x	J+18		1.02 5	
562.92 3		10347.5	(28+)	9784.6	(26+)		0.94 3	
565.1[@a] 2		2364.2	(8+)	1799.2	6+	Q[e]		Q_2A_2=+0.19 1, Q_4A_4=−0.02 2 (1998We23).
566.26 6		11212.3	(29−)	10646.0	(27−)		1.05 5	
574.7[@a] 4		3747.8	(14−)	3173.1	(12−)	Q[e]		Q_2A_2=+0.31 1, Q_4A_4=−0.12 2 (1998We23).
578.4[&]		6989.0	(26+)	6410.7	(24+)			
582.5 2	49 2	5103.7	(19−)	4521.3	(17−)	Q[c]		DCO=1.07 10.
583.1[&]		4114.8	(17−)	3531.6	(16+)			
584.82 6		4381.78+x	J+22	3796.95+x	J+20		0.99 5	
592.6[@a] 2		5578.3	(22+)	4985.7	(20+)	Q[e]		Q_2A_2=+0.36 1, Q_4A_4=−0.11 1 (1998We23).
596.87 5		10944.4	(30+)	10347.5	(28+)		0.89 3	
600.92 6		11813.2	(31−)	11212.3	(29−)		0.95 5	
606.8[&]		4896.8	(20−)	4290.0	(18−)			
611.2[@a] 4		3173.1	(12−)	2561.9	(10−)	Q[e]		Q_2A_2=+0.34 1, Q_4A_4=−0.15 1 (1998We23).
612.1[@] 4		5103.7	(19−)	4491.8	(17−)			
618.96 6		5000.74+x	J+24	4381.78+x	J+22		0.89 5	
621.3[&]		4015.1	(14+)	3394.0	(13−)			
625.1 8	19 1	5610.4	(21−)	4985.7	(20+)	D[d]		DCO=0.45 7
629.93 3		11574.3	(32+)	10944.4	(30+)		0.87 3	
634.60 11		12447.8	(33−)	11813.2	(31−)		0.91 5	
636.6[@a] 2		1064.5	4+	427.90	2+	Q[e]		Q_2A_2=+0.24 1, Q_4A_4=−0.09 1 (1998We23). Q_2A_2=+0.28 1, Q_4A_4=−0.07 1 (1998We23).
640.8 4	35 1	6032.8	(22+)	5391.9				
643.2[@] 2		3531.6	(16+)	2888.4	(14+)			
652.03 6		5652.77+x	J+26	5000.74+x	J+24		0.86 5	
662.07 4		12236.4	(34+)	11574.3	(32+)		0.82 3	
666.0[@a] 2		5163.8	(21−)	4497.9	(19−)	Q[e]		Q_2A_2=+0.32 2, Q_4A_4=−0.10 2 (1998We23).
667.84 7		13115.7	(35−)	12447.8	(33−)		0.89 5	
671.5 4	26 1	4491.8	(17−)	3820.4	(15−)	Q[c]		DCO=1.3 3.
678.2[&f]		6256.5		5578.3	(22+)			
678.7 2	55 2	7941.8		7263.0				
684.57 7		6337.34+x	J+28	5652.77+x	J+26		0.84 5	
693.40 4		12929.8	(36+)	12236.4	(34+)		0.76 3	
695.5 2	84 1	6815.7	(25−)	6120.2	(23−)	Q[c]		DCO=0.95 10
700.11 6		13815.8	(37−)	13115.7	(35−)		0.86 5	
701.0[@] 8		4521.3	(17−)	3820.4	(15−)			
706.2[@a] 4		3394.0	(13−)	2687.8	(11−)	Q[e]		Q_2A_2=+0.345 14, Q_4A_4=−0.11 2 (1998We23).
710.5[@a] 2		4985.7	(20+)	4275.3	(18+)	Q[e]		Q_2A_2=+0.32 1, Q_4A_4=−0.08 1 (1998We23).
713.9[&]		6833.9	(24+)	6120.2	(23−)			
716.20 6		7053.54+x	J+30	6337.34+x	J+28		0.71 5	
721.7 8	12 1	10603.3	(34)	9881.7	(32)			
723.0 2	49 2	8664.8		7941.8				
723.91 6		13653.7	(38+)	12929.8	(36+)		0.68 3	
725.2[&]		5523.3	(20+)	4797.8	(18+)			
731.70 17		14547.5	(39−)	13815.8	(37−)		0.72 5	
734.7[@a] 2		1799.2	6+	1064.5	4+	Q[e]		Q_2A_2=+0.24 1, Q_4A_4=−0.09 1 (1998We23).
739.8 2	65 5	7555.5	(27−)	6815.7	(25−)	Q[c]		DCO=0.80 10
743.7[@a] 2		4275.3	(18+)	3531.6	(16+)	Q[e]		Q_2A_2=+0.28 1, Q_4A_4=−0.11 1 (1998We23).

Continued on next page (footnotes at end of table)

^{150}Nd(^{48}Ca,4nγ) 1996Fo01,1996Kr13,1994Ce04 (continued)

γ(^{194}Hg) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	$I_{(\gamma+ce)}$[#]	Comments
746.89 *19*		7800.4+x	J+32	7053.54+x	J+30		0.54 *5*	
748.9[@a] *2*		1813.4	5⁻	1064.5	4⁺	(E1)[e]		Q_2A_2=−0.22 *1*, Q_4A_4=+0.01 *2* (1998We23).
753.92 *6*		14407.7	(40⁺)	13653.7	(38⁺)		0.56 *3*	
757.8 *2*	93 *4*	6790.6		6032.8	(22⁺)			
762.77 *6*		15310.3	(41⁻)	14547.5	(39⁻)		0.61 *5*	
763.6 *8*	11 *1*	6777.1		6013.4				
766.4[f] *10*	<5	6032.8	(22⁺)	5266.2	(20⁺)			
772.6 *4*	29 *2*	7588.1	(27⁻)	6815.7	(25⁻)	Q[c]		DCO=1.3 *4*
777.73 *6*		8578.2+x	J+34	7800.4+x	J+32		0.44 *5*	
781.0 *4*	28 *1*	9068.2	(30)	8287.2				
783.67 *8*		15191.3	(42⁺)	14407.7	(40⁺)		0.48 *3*	
786.8 *4*	20 *1*	11012.2	(35)	10225.4	(33)			
791.5 *2*	103 *4*	7582.0		6790.6				
793.51 *6*		16103.8	(43⁻)	15310.3	(41⁻)		0.48 *5*	
803.6[&]		5700.4	(22⁻)	4896.8	(20⁻)			
804.8 *8*	13 *1*	7582.0		6777.1				
807.4 *10*	7 *1*	7263.0		6455.2				
807.76 *8*		9385.9+x	J+36	8578.2+x	J+34		0.35 *5*	
813.12 *3*		16004.4	(44⁺)	15191.3	(42⁺)		0.33 *3*	
823.65 *13*		16927.4	(45⁻)	16103.8	(43⁻)		0.30 *5*	
824.2[f]		7453.3	(11⁻)	6629.0	(10⁺)			E_γ: from 1997Ha49.
826.6[&]		6349.9	(22⁺)	5523.3	(20⁺)			
826.6[&f]		7768.4	(27)	6941.8	(25⁻)			
828.6 *8*	10 *1*	5103.7	(19⁻)	4275.3	(18⁺)			
832.4 *5*		7715.5	(13⁻)	6883.0	(12⁺)		0.024	E_γ,$I_{(\gamma+ce)}$: from 1997Ha49.
832.5[@] *2*		6410.7	(24⁺)	5578.3	(22⁺)			
835.7 *4*	22 *2*	9500.4		8664.8				
837.48 *7*		10223.4+x	J+38	9385.9+x	J+36		0.18 *5*	
839.1 *5*		8018.2	(15⁻)	7179.0	(14⁺)		0.01	E_γ,$I_{(\gamma+ce)}$: from 1997Ha49.
842.55 *6*		16847.0	(46⁺)	16004.4	(44⁺)		0.19 *3*	
844.6[f]		8360.7	(17⁻)	7516.1	(16⁺)			E_γ: from 1997Ha49.
848.8[f]		8742.4	(19⁻)	7893.5	(18⁺)			E_γ: from 1997Ha49.
853.85 *12*		17781.3	(47⁻)	16927.4	(45⁻)		0.13 *5*	
864.8[@] *8*		9933.0	(32)	9068.2	(30)			
867.08 *24*		11090.5+x	J+40	10223.4+x	J+38		0.08 *5*	
869.1 *2*	74 *3*	6032.8	(22⁺)	5163.8	(21⁻)	D[d]		DCO=0.48 *7*
872.41 *13*		17719.4	(48⁺)	16847.0	(46⁺)		0.10 *3*	
883.60 *22*		18664.9	(49⁻)	17781.3	(47⁻)		0.09 *5*	
886.1[@] *2*		6049.9	(23⁻)	5163.8	(21⁻)			
891.9[@] *4*		6941.8	(25⁻)	6049.9	(23⁻)			
903.10 *18*		18622.5	(50⁺)	17719.4	(48⁺)		0.05 *3*	
919[f]		3063.8?		2143.4	9⁻			E_γ: from 1997Ha49.
932.0[@] *2*		3820.4	(15⁻)	2888.4	(14⁺)			
945.2[&]		6645.6	(24⁻)	5700.4	(22⁻)			
960.1 *10*	6 *1*	4491.8	(17⁻)	3531.6	(16⁺)			
973.6 *4*	26 *2*	8561.6	(29⁻)	7588.1	(27⁻)			
990.1[@] *8*		4521.3	(17⁻)	3531.6	(16⁺)			
990.9[@] *4*		5266.2	(20⁺)	4275.3	(18⁺)			
995.8 *2*	49 *2*	5493.7		4497.9	(19⁻)			
1003.2 *4*	37 *3*	9564.8	(31⁻)	8561.6	(29⁻)			

Continued on next page (footnotes at end of table)

^{150}Nd(^{48}Ca,4nγ) 1996Fo01,1996Kr13,1994Ce04 (continued)

γ(^{194}Hg) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	$I_{(\gamma+ce)}$[#]	Comments
1006.0 *2*	53 *4*	8561.6	(29⁻)	7555.5	(27⁻)	Q[c]		DCO=0.59 *10* DCO for gate on a ΔJ=1 transition.
1027.6 *4*	30 *1*	6013.4		4985.7	(20⁺)			
1029.7 *8*	18 *1*	9591.3	(31⁻)	8561.6	(29⁻)			
1047.0 *4*	24 *1*	6032.8	(22⁺)	4985.7	(20⁺)			
1116.5 *4*	20 *1*	5391.9		4275.3	(18⁺)			
1116.6 *8*	15 *1*	4005.0	(15⁻)	2888.4	(14⁺)			
1126.5[&]		4015.1	(14⁺)	2888.4	(14⁺)			
1152.0[&f]		6675.6	(22⁺)	5523.3	(20⁺)			
3488.7 *5*		6883.0	(12⁺)	3394.0	(13⁻)	D	0.01	A_2=−0.5 *3* (1996Kh04) E_γ,$I_{(\gamma+ce)}$: from 1997Ha49.
3564.8 *5*		6629.0	(10⁺)	3063.8?			0.006	E_γ,$I_{(\gamma+ce)}$: from 1997Ha49.
3708[f]		6883.0	(12⁺)	3173.1	(12⁻)	D	0.001	A_2=−0.5 *3* (1996Kh04) E_γ,$I_{(\gamma+ce)}$: from 1997Ha49.
3942.0 *5*		6629.0	(10⁺)	2687.8	(11⁻)		0.002	E_γ,$I_{(\gamma+ce)}$: from 1997Ha49.
4194.8 *5*		6883.0	(12⁺)	2687.8	(11⁻)	D	0.008	A_2=−0.5 *3* (1996Kh04) E_γ,$I_{(\gamma+ce)}$: from 1997Ha49.
4485.5 *5*		6629.0	(10⁺)	2143.4	9⁻	D	0.011	A_2=−0.5 *3* (1996Kh04) E_γ,$I_{(\gamma+ce)}$: from 1997Ha49.
4978.1 *5*		7453.3	(11⁻)	2475.5	(12⁺)	D	0.006	A_2=−0.38 *25* (1997Ha49) E_γ,$I_{(\gamma+ce)}$: from 1997Ha49.
5029.9 *5*		7453.3	(11⁻)	2423.5	(10⁺)		0.003	E_γ,$I_{(\gamma+ce)}$: from 1997Ha49.

[†] For normal bands values are from 1996Fo01. For superdeformed bands values are from 1996Kr13. Values for superdeformed bands are also given by 1994Ce04, 1990Be11, 1990St12 and 1990Ri05. 1996Fo01 state that uncertainty is 0.2 to 0.4 keV for the strong and 0.8 keV to 1.0 for the weakest lines. The evaluators assign 0.2 for Iγ>40 and for other prominent lines in the figures 1 to 3 (1996Fo01), 0.4 for Iγ=20 to 40, 0.8 for Iγ=10 to 20 and 1.0 for Iγ<10.

[‡] From 1996Fo01, from γγ coin data, relative to Iγ(427.9γ).

[#] For SD bands values are relative I(γ+ce) values from 1996Kr13 within each band. Intensity plots are also given by 1992ShZR (see also 1990Ri05 and 1990Cu06 from the same group) for three SD bands and by 1990Be11 for SD-1 and SD-3.

[@] From level scheme figure 1 or spectral figures 2 and 3 in 1996Fo01. Uncertainty is determined by comparison of γ peak with peaks of transitions in Table 1 with assigned uncertainties above based on their intensities in Table 1.

[&] Rounded values from 1986Hu02 in ^{186}W(^{13}C,5nγ); not reported in 1996Fo01.

[a] Transition observed in ce data in (α,4nγ) (1983Gu05).

[b] From 1998We23, transition at high excitation energy but not assigned in the decay scheme.

[c] R(DCO) consistent with ΔJ=2, quadrupole (E2) (1996Fo01).

[d] R(DCO) consistent with ΔJ=1, dipole (+quadrupole) (1996Fo01).

[e] From γ(θ) data of 1998We23. Mult=Q indicates stretched quadrupole, whereas mult=D+Q and D indicate ΔJ=1 transitions. 1998We23 assign E2 for stretched quadrupole, M1+E2 and E1 for D+Q, and D, respectively.

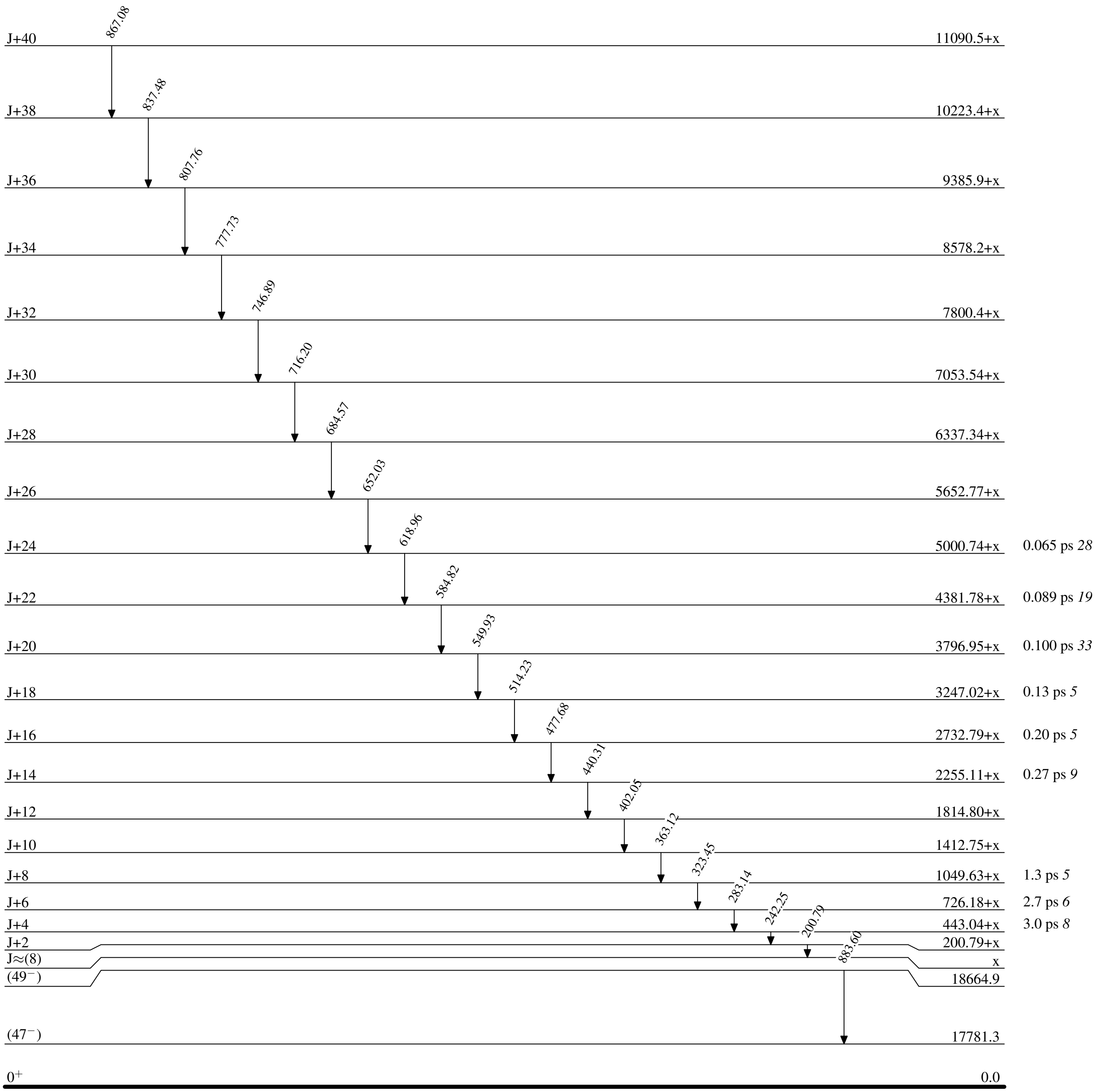
[f] Placement of transition in the level scheme is uncertain.

[x] γ ray not placed in level scheme.

$^{150}Nd(^{48}Ca,4n\gamma)$ 1996Fo01,1996Kr13,1994Ce04

Level Scheme

Intensities: Relative I_γ

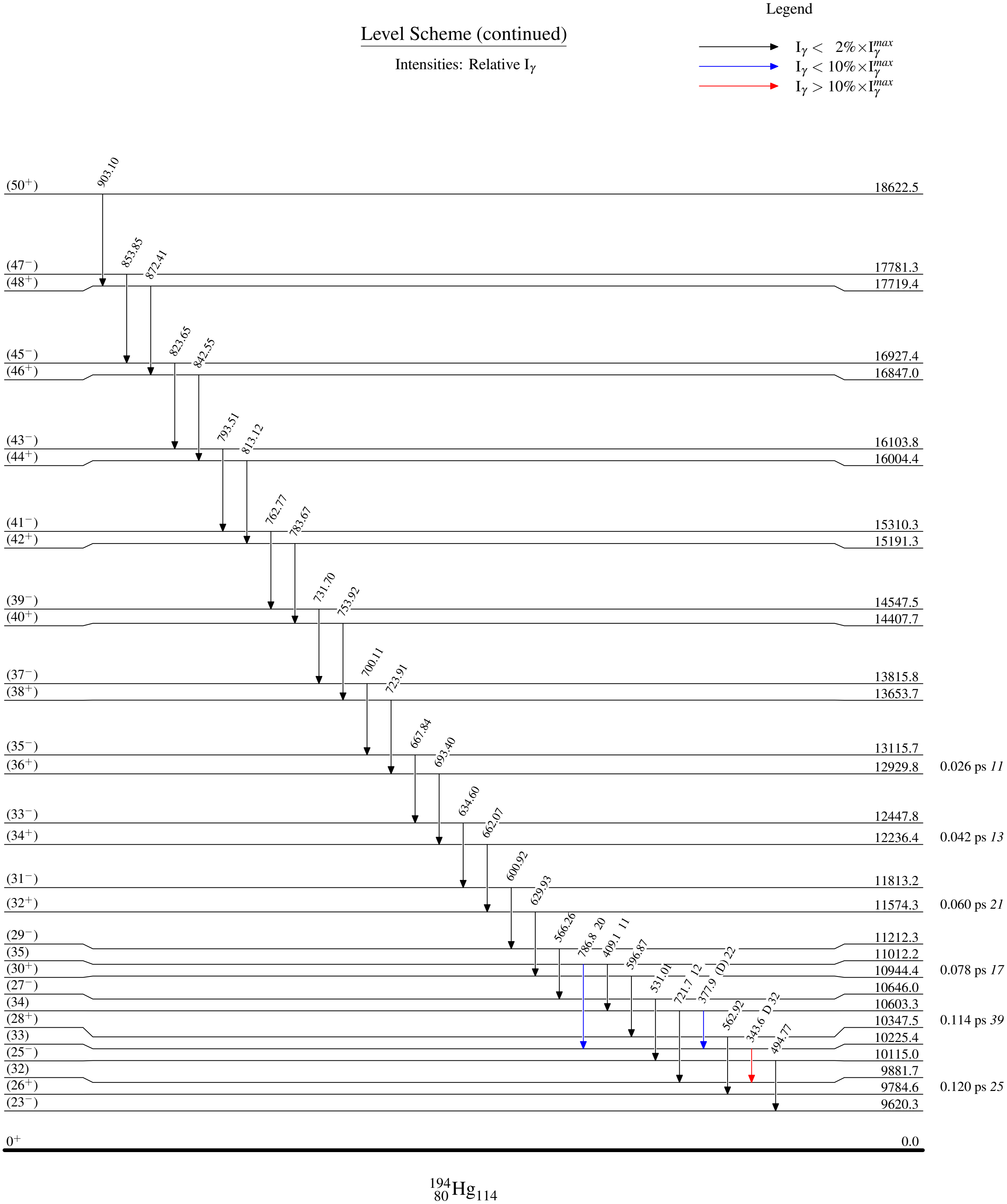


$^{194}_{80}Hg_{114}$

^{150}Nd(^{48}Ca,4nγ) 1996Fo01,1996Kr13,1994Ce04

Level Scheme (continued)

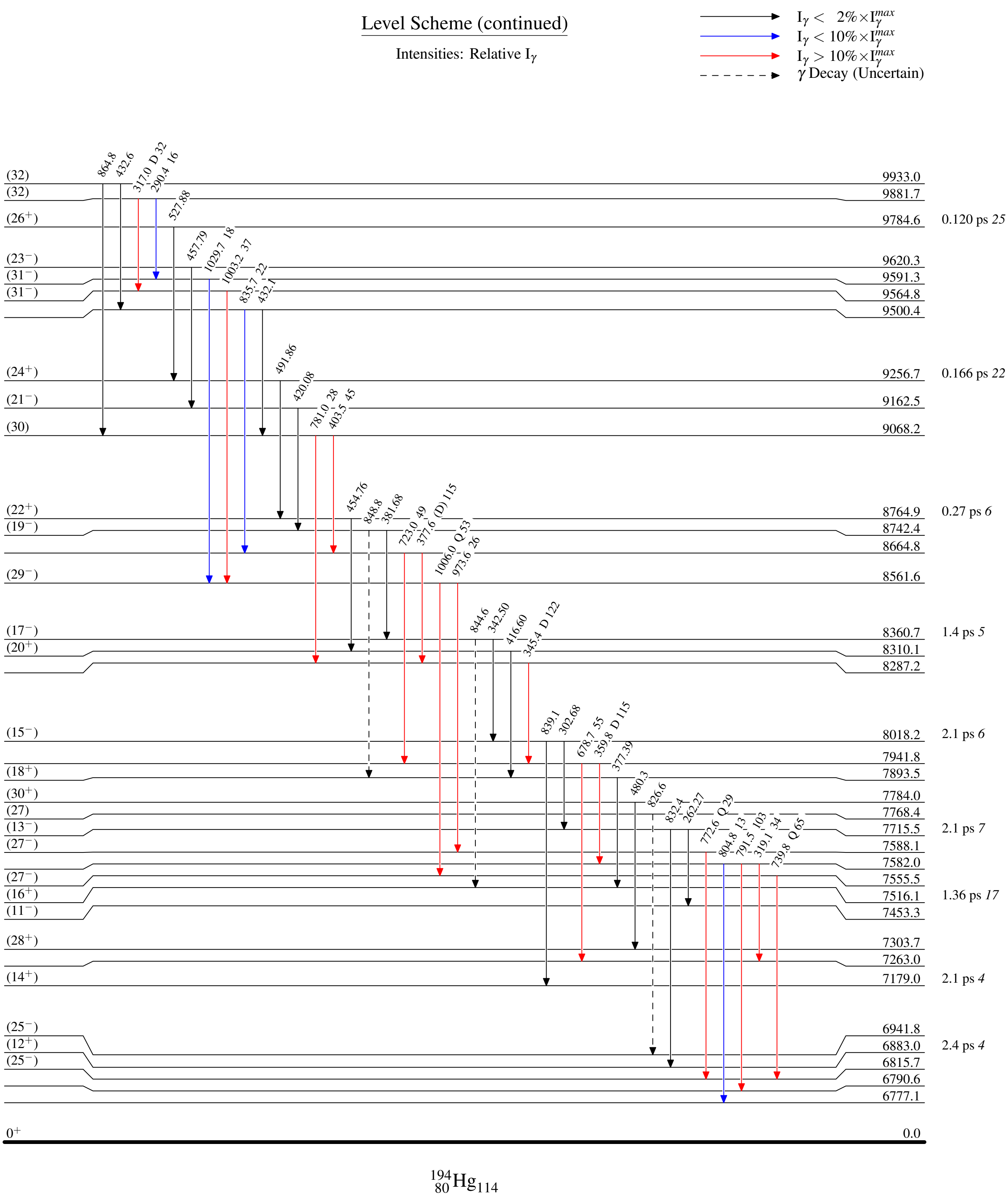
Intensities: Relative I_γ

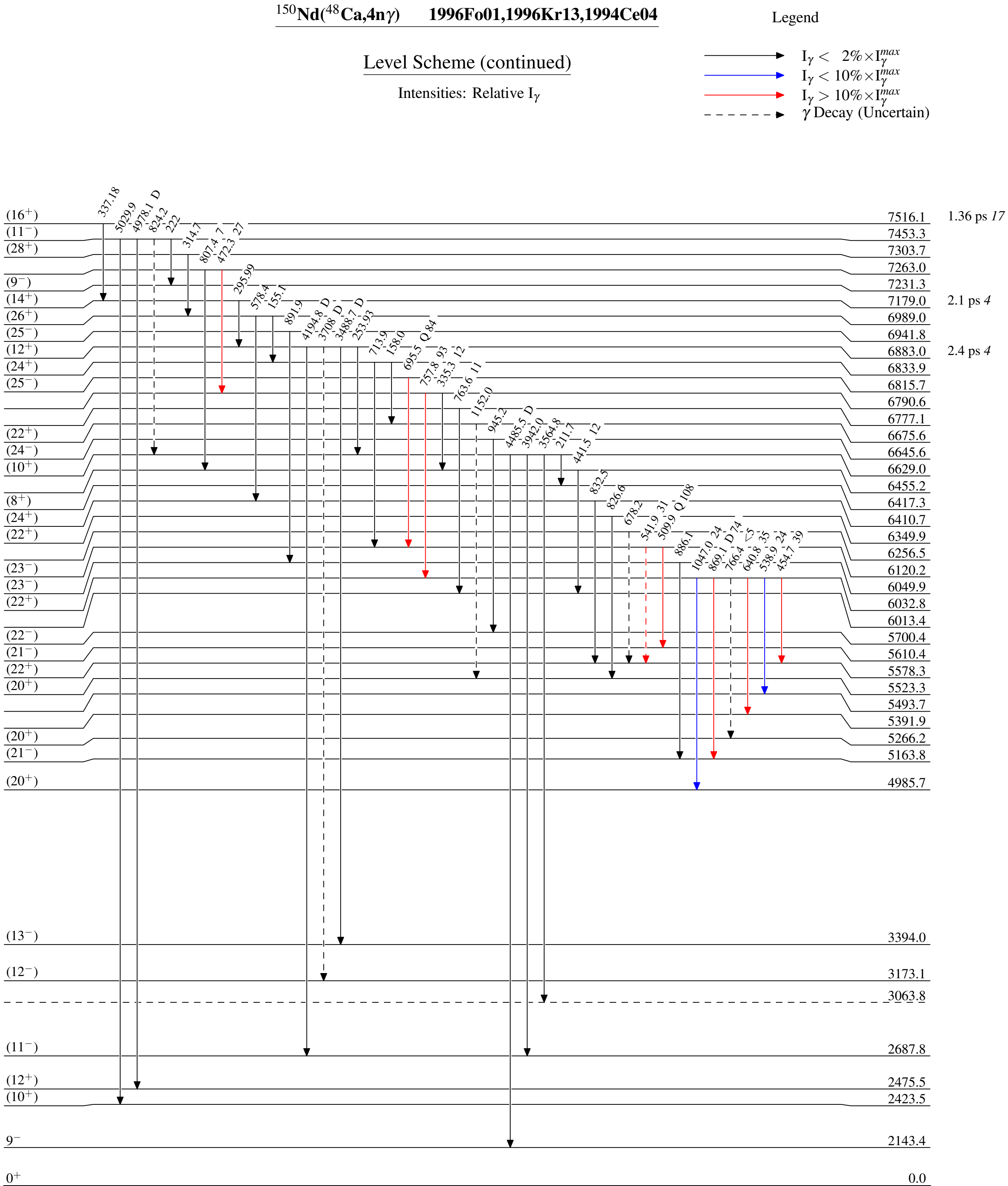


$^{150}Nd(^{48}Ca,4n\gamma)$ 1996Fo01,1996Kr13,1994Ce04

Level Scheme (continued)

Intensities: Relative I_γ





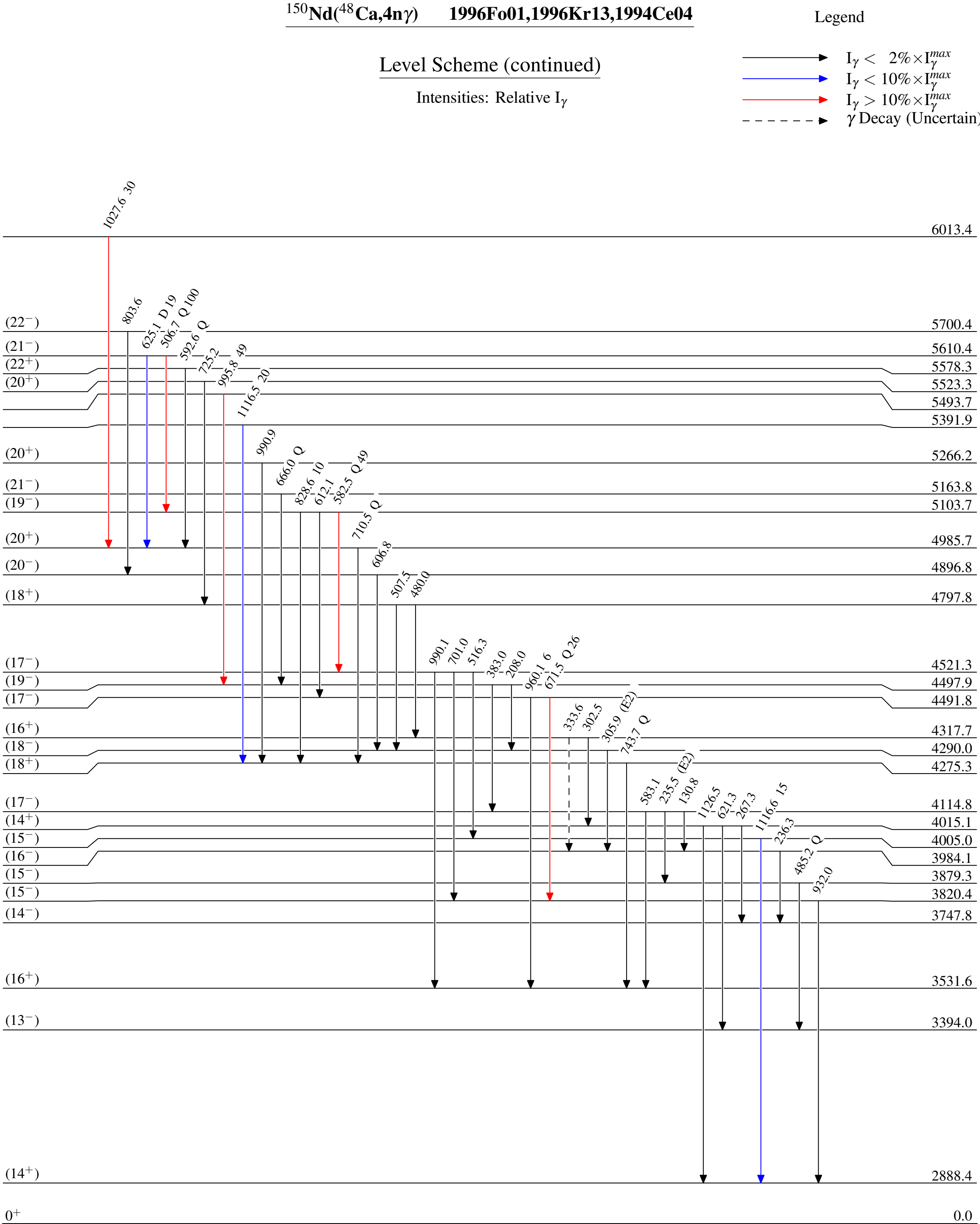
^{150}Nd(^{48}Ca,4nγ) 1996Fo01,1996Kr13,1994Ce04
Level Scheme (continued)
Intensities: Relative Iγ
Legend
Iγ < 2%×Iγ^max
Iγ < 10%×Iγ^max
Iγ > 10%×Iγ^max
γ Decay (Uncertain)
(16+) 7516.1 1.36 ps 17
(11−) 7453.3
(28+) 7303.7
7263.0
(9−) 7231.3
(14+) 7179.0 2.1 ps 4
(26+) 6989.0
(25−) 6941.8
(12+) 6883.0 2.4 ps 4
(24+) 6833.9
(25−) 6815.7
6790.6
6777.1
(22+) 6675.6
(24−) 6645.6
(10+) 6629.0
6455.2
(8+) 6417.3
(24+) 6410.7
(22+) 6349.9
6256.5
(23−) 6120.2
(23−) 6049.9
(22+) 6032.8
6013.4
(22−) 5700.4
(21−) 5610.4
(22+) 5578.3
(20+) 5523.3
5493.7
5391.9
(20+) 5266.2
(21−) 5163.8
(20+) 4985.7
(13−) 3394.0
(12−) 3173.1
3063.8
(11−) 2687.8
(12+) 2475.5
(10+) 2423.5
9− 2143.4
0+ 0.0
337.18
5029.9
4978.1 D
824.2
222
314.7
807.4 7
472.3 27
295.99
578.4
155.1
891.9
4194.8 D
3708 D
3488.7 D
253.93
713.9
158.0
695.5 Q 84
757.8 93
335.3 12
763.6 11
1152.0
945.2
4485.5 D
3942.0
3564.8
211.7
441.5 12
832.5
826.6
678.2
541.9 31
509.9 Q 108
886.1
1047.0 24
869.1 D 74
766.4 <5
640.8 35
538.9 24
454.7 39

$^{194}_{80}Hg_{114}$

^{150}Nd(^{48}Ca,4nγ) 1996Fo01,1996Kr13,1994Ce04

Level Scheme (continued)

Intensities: Relative I_γ



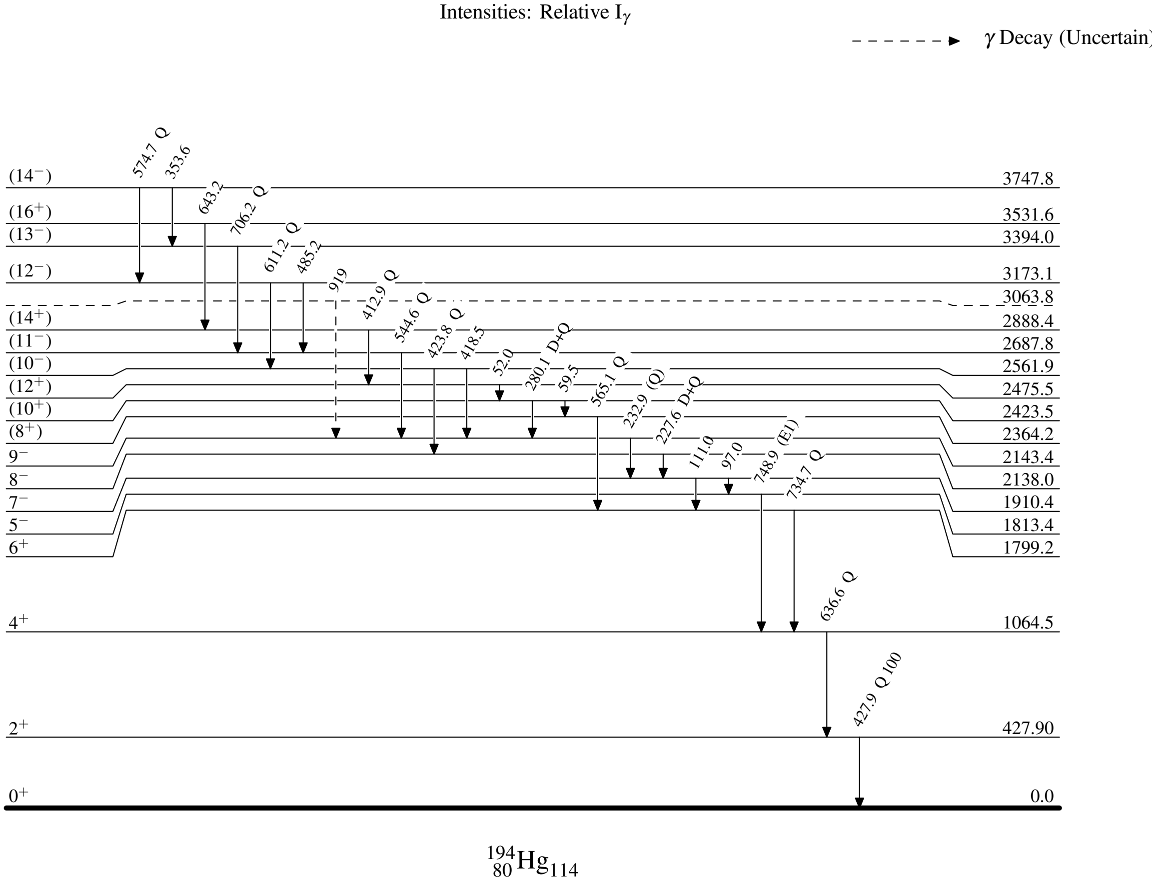
$^{194}_{80}Hg_{114}$

^{150}Nd(^{48}Ca,4nγ) 1996Fo01,1996Kr13,1994Ce04

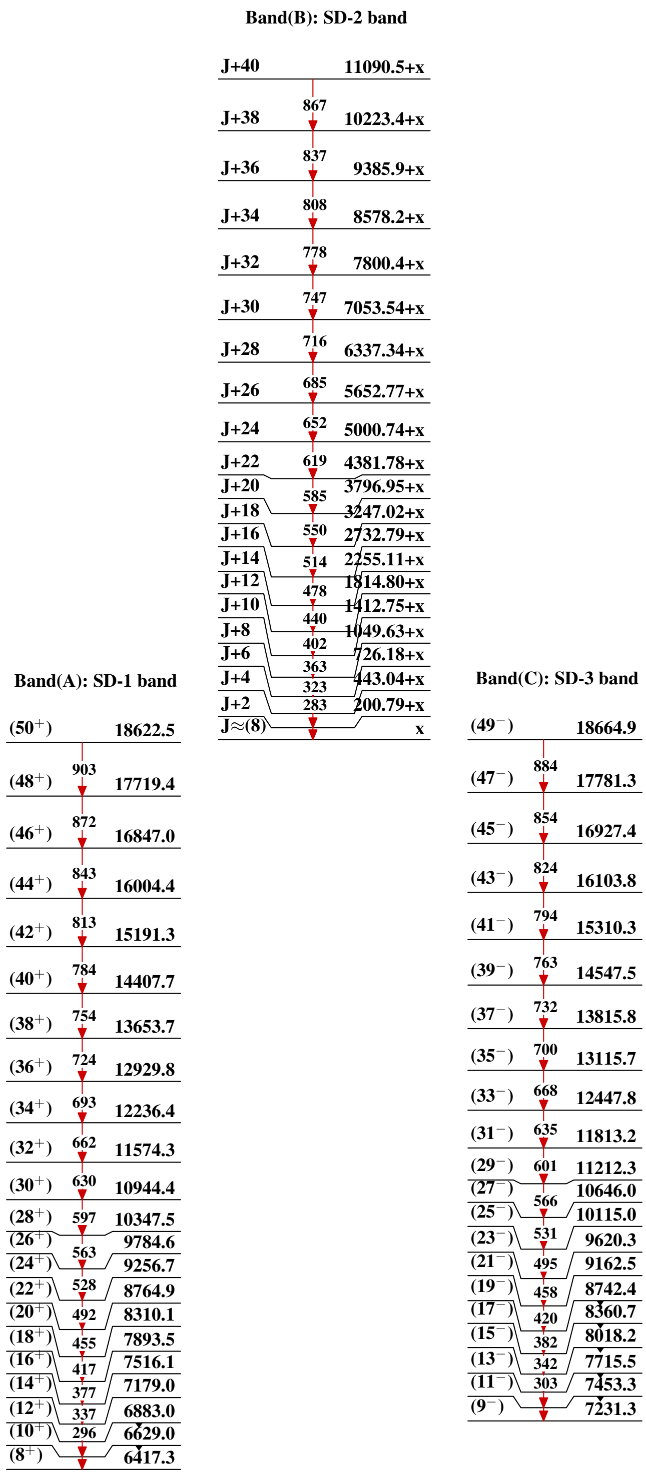
Legend

Level Scheme (continued)

Intensities: Relative I_γ



$^{150}Nd(^{48}Ca,4n\gamma)$ 1996Fo01,1996Kr13,1994Ce04



$^{194}_{80}Hg_{114}$