(HI,xnγ) 1995Fi01,1993Ol02,1985Ba47

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 111, 1807 (2010)	15-Jun-2010

Also includes Er(α,xnγ).

Others:1966Mo01, 1966Sh11, 1967Ke08, 1969Ka03, 1970Se15, 1972Fe08, 1978Ba16, 1981Si01, 1981Si10, 1982Wa19, 1988Ta18, 1989Sc05, 1990He24, 1990Li34, 1991Gi01, 1992He05, 1994Ol04.

For data at high excitation, see 1988Ta18 (studied reaction mechanisms in ^{170}Er + ^{22}Ne at 10 MeV/nucleon), 1989Sc05 (determined average B(E2)(W.u.)=300 for γ-ray continuum transitions up to highest spins in ^{124}Sn(^{48}Ca,4nγ)), 1990Li34 (used Doppler shift methods in ^{124}Sn(^{48}Ca,4nγ), E(^{48}Ca)=201 MeV, to study ridge structure in bands above the near-yrast discrete line bands, but below the region in which rotational energy correlations are heavily damped; showed reduction in deformation parameter, going from ^{164}Yb to ^{166}Yb to ^{168}Yb), 1991Gi01 (measured γ-ray multiplicities in ^{154}Sm(^{16}O,2nγ), and 1992He05 (used 3-dimensional γ-ray energy correlations to measure rotational damping widths in ^{124}Sn(^{48}Ca,4nγ), E(^{48}Ca)=208 MeV). Others: 1981Si01, 1981Si10, 1990He24, 1999Le12.

1972Jo02: ^{167}Er(α,3nγ), E(α)=43 MeV; Ge(Li) detectors; measured Eγ, Iγ, γ(θ) (θ=90°−155°), γγ coin, excit, beam-γ(t); observed g.s. rotational band levels with J≤18.

1972Mo44: ^{166}Er(α,2nγ), Eα=16-38.5 MeV; ^{160}Gd(^{12}C,4nγ), E(^{12}C)=50-82 MeV; 96% ^{166}Er or 99.99% ^{160}Gd targets; Ge(Li) detectors; measured excit, Eγ, Iγ, γγ coin (40 ns timing resolution), γ(θ) (90°−157.5°). Observed g.s. rotational band levels with J≤20.

1982Wa19: ^{166}Er(α,2nγ); E(α)=27 MeV; measured Eγ, Iγ (planar germanium cryst, FWHM=650 eV at 122 keV), γγ coin, γ(θ); analyzed configuration contributions to the structure of the $K^\pi=3^+$ excitation (bandhead at 1452).

1985Ba47: ^{154}Sm(^{18}O,4nγ), E(^{18}O)=78 MeV; ^{124}Sn(^{48}Ca,4nγ), E(^{48}Ca)=201 MeV; θ=30°, 90°, 150°; measured Eγ, Iγ (Compton-suppressed germanium detectors, bismuth-germanate cryst), γγ coin, γ(θ); deduced neutron-pair correlations; used cranking-model and gauge-space analyses to interpret ^{168}Yb structure.

1993Ol02: ^{124}Sn(^{48}Ca,4nγ), E(^{48}Ca)=210 MeV; measured Eγ, γγ coin (high energy resolution array, consisting of 20 Compton-suppressed germanium detectors and an inner ball of 40 BGO detectors); studied transition from strong static pairing to weak static pairing; extended known bands (1985Ba47) to higher excitation and identified four new bands.

1995Fi01: ^{124}Sn(^{48}Ca,4nγ), E(^{48}Ca)=210 MeV; EUROGAM detector array (45 Ge detectors with BGO suppression shield); measured Eγ, Iγ, γγγ coin.

The level scheme incorporates five rotational bands from 1985Ba47 (extended by 1993Ol02), four additional bands from 1993Ol02, and their extensions and interconnections from 1995Fi01, and an M1 band from 1994Ol04. An additional band (K^π+(3^+)) is taken from 1982Wa19.

^{168}Yb Levels

Band(Bh) $K^\pi=2^+$ γ-vibration band.

E(level)†	Jπ‡	$T_{1/2}$#	E(level)†	Jπ‡	$T_{1/2}$#	E(level)†	Jπ‡	$T_{1/2}$#
0.0[b]	0^+		1618.5 *6*	7^+		2443.5 *7*	11^+	
87.73[b] *1*	2^+	<20 ns	1675.5[c] *6*	5^+		2488.5[b] *6*	14^+	<20 ns
286.550[b] *23*	4^+	<20 ns	1820.7[c] *7*	6^+		2514.5[h] *15*	(13)	
585.30[b] *8*	6^+	<20 ns	1842.6[d] *10*	6^-		2824.9[d] *10*	12^-	
970.05[b] *13*	8^+	<20 ns	1935.9[b] *6*	12^+	<20 ns	2846.2[e] *10*	13^-	
984[&a]	2^+[&]		1945.4[h] *11*	(11)		2930.9 *9*	13^+	
1067[&a]	(3^+)[&]		1986.6[c] *9*	7^+		3073.1[b] *7*	16^+	<20 ns
1302.5 *8*	5^+		2002.9 *7*	9^+		3131.4[h] *18*	(15)	
1425.45[b] *24*	10^+	<20 ns	2100.6[d] *9*	8^-		3294.9[d] *14*	14^-	
1452.1[c] *5*	3^+		2175.6[c] *14*	(8^+)		3310.2[e] *9*	15^-	
1552.5[c] *6*	4^+		2426.5[d] *9*	10^-		3447.1 *14*	15^+	

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(HI,xnγ) 1995Fi01,1993Ol02,1985Ba47 (continued)

^{168}Yb Levels (continued)

E(level)[†]	Jπ[‡]	T1/2[#]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]
3532.2[i] 10	(15+)		6623.9[b] 19	26+	11959[e] 3	37−
3613.2[f] 10	15−		6809.6[f] 18	25−	12864[b] 3	38+
3686.9[b] 8	18+	<20 ns	6835 3	25+	12985[g] 3	(38+)
3797.5[h] 21	(17)		6938.7[i] 21	(25+)	13023[d] 4	38−
3821.1[e] 10	17−		7024[h] 3	(25)	13128[e] 3	39−
3827.5[d] 17	16−		7072.5[g] 18	(26+)	14033[b] 4	40+
3981.9 17	17+		7081.9[e] 19	27−	14138[d] 4	40−
4092.2[i] 10	(17+)		7156[d] 3	26−	14190[g] 4	(40)[@]
4133.8[g] 10	(18+)		7516.9[b] 21	28+	14362[e] 4	41−
4165.1[f] 9	17−		7599.4[f] 21	27−	15228[b] 4	42+
4336.9[b] 8	20+		7727 3	27+	15269[d] 4	42−
4373.9[e] 10	19−		7791.7[i] 23	(27+)	15578[e] 4	43−
4410.0[d] 20	18−		7912.0[g] 21	(28+)	16457?[b] 4	(44+)
4514.3[h] 23	(19)		7918.2[e] 22	29−	16846?[e] 4	(45−)
4579.5 20	19+		7984[d] 3	28−	0.0+x[j]	(20)
4721.1[i] 11	(19+)		8453.4[f] 23	29−	625.7+x[j] 10	(22)
4762.7[f] 10	19−		8475.2[b] 23	30+	1289.2+x[j] 15	(24)
4786.1[g] 10	(20+)		8671 3	29+	2019.0+x[j] 18	(26)
4968.5[e] 11	21−		8697.7[i] 25	(29+)	2802.1+x[j] 20	(28)
5030.3[d] 23	20−		8801.3[g] 23	(30+)	3644.5+x[j] 23	(30)
5036.9[b] 12	22+		8825.6[e] 24	31−	4548.9+x[j] 25	(32)
5255.9 22	21+		8880[d] 3	30−	5514+x[j] 3	(34)
5287.1[h] 25	(21)		9372.2[f] 25	31−	6539+x[j] 3	(36)
5400.5[f] 11	21−		9496[b] 3	32+	7623+x[j] 3	(38)
5404.6[i] 15	(21+)		9748.3[g] 25	(32+)	8766+x[j] 4	(40)
5511.1[g] 11	(22+)		9803[e] 3	33−	0.0+y[k]	J
5612.3[e] 13	23−		9841[d] 3	32−	173.8+y[k] 10	J+1
5686.9[d] 25	22−		10353[f] 3	33−	368.6+y[k] 15	J+2
5797.4[b] 16	24+		10575[b] 3	34+	584.1+y[k] 18	J+3
6009.0 24	23+		10760[g] 3	(34+)	820.2+y[k] 19	J+4
6080.6[f] 15	23−		10848[e] 3	35−	1075.4+y[k] 19	J+5
6122[h] 3	(23)		10861[d] 4	34−	1349.8+y[k] 20	J+6
6143.3[i] 18	(23+)		11388[f] 3	35−	1642.3+y[k] 21	J+7
6276.0[g] 15	(24+)		11703[b] 3	36+	1952.2+y[k] 21	J+8
6314.7[e] 16	25−		11841[g] 3	(36+)	2279.3+y[k] 22	J+9
6391.9[d] 25	24−		11931[d] 4	36−	2616.7+y?[k] 24	J+10

[†] From least-squares fit to Eγ, assigning 1 keV uncertainty to all values for which authors did not state the uncertainty, and holding the energies of the 964 and 1067 levels fixed.
[‡] From 1995Fi01, except As noted, based on known or implied multipolarities of transitions and fits of cascades of γ rays into expected rotational bands (authors′ values). See ^{168}Yb Adopted Levels for evaluator′s assignments.
[#] Upper limit from beam-γ(t) In (α,3nγ) (1972Jo02).
[@] From 1995Fi01.
[&] From Adopted Levels; 1982Wa19 imply observation of these levels in ^{166}Er(α,2nγ).
[a] Rounded value from Adopted Levels.
[b] Band(A): Kπ=0+ g.s. band.

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(HI,xnγ) 1995Fi01,1993Ol02,1985Ba47 (continued)

^{168}Yb Levels (continued)

[c] Band(B): $K^\pi=(3^+)$ band. J^π assignments for this band are taken from 1982Wa19.
[d] Band(C): $\pi=-$, $\alpha=1$ band. High-excitation band (feeds into 2^+ γ-vibration band).
[e] Band(D): $\pi=-$, $\alpha=1$ band 2. High-excitation band.
[f] Band(E): $\pi=-$, $\alpha=1$ band 1. High-excitation band.
[g] Band(F): $\alpha=(0)$ band. High-excitation band. Tentative $\pi=+$ for this band is taken from 1993Ol02.
[h] Band(G): $\alpha=1$ band. High-excitation band. Note that 1993Ol02 suggest J values that are two units higher.
[i] Band(H): $\pi=(+)$, $\alpha=1$ band. High-excitation band.
[j] Band(I): $\alpha=0$ band. Feeds into g.s. band, but connecting transitions unknown. J assignments for this band are taken from 1993Ol02.
[k] Band(J): M1 band (1994Ol04).

γ(^{168}Yb)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[f]	Comments
87.73[c] *1*		87.73	2^+	0.0	0^+	E2	5.35	Mult.: A_2=+0.12 *5*, A_4=−0.10 *4* (1972Jo02) from (α,3nγ). Not M2 from RUL.
100[a]		1552.5	4^+	1452.1	3^+			
123[a]		1675.5	5^+	1552.5	4^+			Iγ(123γ)/Iγ(223γ)=1.58 (1982Wa19).
145[a]		1820.7	6^+	1675.5	5^+			Iγ(145γ)/Iγ(268γ)=1.0 (1982Wa19).
166[a]		1986.6	7^+	1820.7	6^+			Iγ(166γ)/Iγ(311γ)=0.63 (1982Wa19).
173.8[d]		173.8+y	J+1	0.0+y	J			
189[ah]		2175.6	(8^+)	1986.6	7^+			
194.8[d]		368.6+y	J+2	173.8+y	J+1			
198.82[c] *2*	99.1 *14*	286.550	4^+	87.73	2^+	E2	0.274	Iγ=99 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: A_2=+0.41 *3*, A_4=−0.04 *4*, I(30°)/I(90°)=0.97 *2* (1985Ba47). A_2=+0.25 *4*, A_4=−0.02 *3* (1972Jo02) from (α,3nγ). A_2=+0.25 *3*, A_4=−0.07 *5* (1972Mo44). not M2 from RUL.
215.5[d]		584.1+y	J+3	368.6+y	J+2			
223[a]		1675.5	5^+	1452.1	3^+			I_γ: see comment with 123γ.
236.1[d]		820.2+y	J+4	584.1+y	J+3			
255.2[d]		1075.4+y	J+5	820.2+y	J+4			
258[e] *1*	2.3 *8*	2100.6	8^-	1842.6	6^-			
268[a]		1820.7	6^+	1552.5	4^+			I_γ: see comment with 145γ.
274.4[d]		1349.8+y	J+6	1075.4+y	J+5			
292.5[d]		1642.3+y	J+7	1349.8+y	J+6			
298.75[c] *7*	100.0 *16*	585.30	6^+	286.550	4^+	E2	0.0749	Iγ=100 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: A_2=+0.265 *26*, A_4=−0.11 *3*, I(30°)/I(90°)=1.00 *2* (1985Ba47). A_2=+0.28 *4*, A_4=−0.03 *3* (1972Jo02) from (α,3nγ). A_2=+0.29 *2*, A_4=−0.12 *4* (1972Mo44). not M2 from RUL.
309.9[d]		1952.2+y	J+8	1642.3+y	J+7			
311[a]		1986.6	7^+	1675.5	5^+			I_γ: see comment with 166γ.
316[b]		1618.5	7^+	1302.5	5^+			
325.8[e] *10*	4.1 *9*	2426.5	10^-	2100.6	8^-	(E2)	0.0578 *10*	Iγ=3 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.89 *24* (1985Ba47).
327.1[d]		2279.3+y	J+9	1952.2+y	J+8			
337.4[dh]		2616.7+y?	J+10	2279.3+y	J+9			

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(HI,xnγ) 1995Fi01,1993Ol02,1985Ba47 (continued)

γ(^{168}Yb) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[f]	Comments
368.6[dh]		368.6+y	J+2	0.0+y	J			
381.3[e] *10*	19	2824.9	12^-	2443.5	11^+			
384.3	114.0 *11*	2002.9	9^+	1618.5	7^+	(E2)	0.0360	I_γ: for 384.3γ+384.8γ doublet. see comment on 385γ from 970 level.
384.75[c] *10*	114.0 *11*	970.05	8^+	585.30	6^+	E2	0.0359	I_γ: combined value for 384.3γ and 384.8γ. Iγ=113 for E(^{48}Ca)=201 MeV (1985Ba47) for doublet. Mult.: A_2=+0.30 *4*, A_4=−0.05 *3* (1972Jo02) from (α,3nγ). A_2=+0.37 *4*, A_4=−0.10 *7* (1972Mo44). not M2 from RUL. A_2=+0.251 *25*, A_4=−0.105 *26*, I(30°)/I(90°)=1.11 *2* (1985Ba47) for doublet.
385[a]		1452.1	3^+	1067	(3^+)			
398.6[e] *10*	15.0 *9*	2824.9	12^-	2426.5	10^-	(E2)	0.0325	Iγ=15 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.55 *4* (1985Ba47).
423.7[e] *10*	3.4 *2*	2426.5	10^-	2002.9	9^+	(E1+M2)	0.11 *11*	Iγ=2 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: A_2=−0.56 *24*, A_4=−0.2 *3*, I(30°)/I(90°)=0.75 *9* (1985Ba47).
440.4[b]	3.1 *2*	2443.5	11^+	2002.9	9^+			
447[e] *1*		4133.8	(18^+)	3686.9	18^+			
450[e] *1*		4786.1	(20^+)	4336.9	20^+			
455.4[@] *2*	90.6 *14*	1425.45	10^+	970.05	8^+	E2	0.0227	Iγ=91 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: A_2=+0.22 *3*, A_4=−0.09 *3*, I(30°)/I(90°)=1.17 *2* (1985Ba47). A_2=+0.32 *4*, A_4=−0.04 *3* (1972Jo02) from (α,3nγ). A_2=+0.34 *6*, A_4=−0.06 *9* (1972Mo44). not M2 from RUL.
464.0[e] *10*	6.6 *4*	3310.2	15^-	2846.2	13^-			
468[a]		1452.1	3^+	984	2^+			
470.0[e] *10*	14.2 *9*	3294.9	14^-	2824.9	12^-	(E2)	0.0209	Iγ=5 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.21 *6* (1985Ba47).
482.2[e] *10*		2100.6	8^-	1618.5	7^+			
487.3[b]	4.0 *2*	2930.9	13^+	2443.5	11^+	(E2)	0.0190	Iγ=4 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.04 *6* (1985Ba47).
491.3[d]		1075.4+y	J+5	584.1+y	J+3			
510.5[@] *5*	102.4 *10*	1935.9	12^+	1425.45	10^+	(E2)	0.01692	I_γ: combined value for 510.5γ and 511.0γ (1995Fi01). Iγ=104 for E(^{48}Ca)=201 MeV (1985Ba47) for doublet. Mult.: I(30°)/I(90°)=1.000 *2* (1985Ba47) for doublet (reported uncertainty possibly a misprint of 0.02). Not M2 from RUL.
511.0[e] *10*	102.4 *10*	3821.1	17^-	3310.2	15^-	(E2)	0.0169	I_γ: combined value for 510.6γ and 511.0γ. see comment on 511γ from 1936 level.
516.2[b]	3.2 *2*	3447.1	15^+	2930.9	13^+	(E2)	0.01645	Iγ=3 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.44 *14* (1985Ba47).
520[e] *1*		1945.4	(11)	1425.45	10^+			
529.6[d]		1349.8+y	J+6	820.2+y	J+4			
532.6[e] *10*	12.4 *9*	3827.5	16^-	3294.9	14^-	(E2)	0.01522	Iγ=4 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=2.15 *11* (1985Ba47).

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(HI,xnγ) 1995Fi01,1993Ol02,1985Ba47 (continued)

γ(^{168}Yb) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[f]	Comments
534.8[b]	2.2 *2*	3981.9	17^+	3447.1	15^+	(E2)	0.01506	Iγ=2 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=3.1 *3* (1985Ba47).
540[e] *1*		1842.6	6^-	1302.5	5^+	E1	0.00513	Mult.: from Adopted Gammas.
552.0[e] *5*	109.0 *11*	4165.1	17^-	3613.2	15^-			see comment on 553γ from 2489 level.
552.6[@] *3*	109.0 *11*	2488.5	14^+	1935.9	12^+	E2	0.01389	I_γ: for 553γ doublet (1995Fi01). Iγ=93 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: A_2=+0.31 *4*, A_4=−0.12 *3* (1972Jo02) from (α,3nγ); not M2 from RUL. A_2=+0.17 *3*, A_4=−0.08 *4*, I(30°)/I(90°)=1.25 *2* (1985Ba47) for doublet.
552.8[e] *10*	109.0 *11*	4373.9	19^-	3821.1	17^-	(E2)	0.01388	I_γ: combined value for 553γ doublet. Iγ=93 for E(^{48}Ca)=201 MeV (1985Ba47) for doublet.
560.4[b]	5.5 *15*	4092.2	(17^+)	3532.2	(15^+)			
566.9[d]		1642.3+y	J+7	1075.4+y	J+5			
569.1[b]	10.5 *11*	2514.5	(13)	1945.4	(11)			
575.3[e] *10*	2.4 *3*	5612.3	23^-	5036.9	22^+			other Eγ: 574.2 In 1993Ol02.
582.5[e] *10*	11.9 *7*	4410.0	18^-	3827.5	16^-	(E2)	0.01222	Iγ=13 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.11 *12* (1985Ba47).
584.5[@] *3*	53.4 *15*	3073.1	16^+	2488.5	14^+	(E2)	0.01212	Iγ=53 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: A_2=+0.25 *4*, A_4=−0.09 *4*, I(30°)/I(90°)=1.10 *2* (1985Ba47). A_2=+0.27 *5*, A_4=−0.12 *4* (1972Jo02) from (α,3nγ).
594.4[e] *10*	16.6 *10*	4968.5	21^-	4373.9	19^-	(E2)	0.01164	Iγ=15 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.15 *11* (1985Ba47).
597.6[b]	2.0 *2*	4579.5	19^+	3981.9	17^+	(E2)	0.01149	Iγ=6 for E(^{48}Ca)=201 MeV (1985Ba47) for 597.6γ and 597.7γ. Mult.: I(30°)/I(90°)=1.12 *13* (1985Ba47).
598.1[e] *10*	12.1 *16*	4762.7	19^-	4165.1	17^-			combined value for 597.6γ and 597.7γ. Iγ=6 for E(^{48}Ca)=201 MeV (1985Ba47).
602.4[d]		1952.2+y	J+8	1349.8+y	J+6			
613.8[@] *4*	44.6 *13*	3686.9	18^+	3073.1	16^+	(E2)	0.01079	Iγ=39 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: A_2=+0.27 *8*, A_4=−0.10 *9*, I(30°)/I(90°)=1.13 *8* (1985Ba47). A_2=+0.34 *6*, A_4=−0.26 *6* (1972Jo02) from (α,3nγ).
616.9[b]	9.4 *12*	3131.4	(15)	2514.5	(13)			
620.3 *10*	10.5 *5*	5030.3	20^-	4410.0	18^-	(E2)	0.01052	Iγ=6 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.15 *13* (1985Ba47).
625.7[b]		625.7+x	(22)	0.0+x	(20)			
629.1[b]	9.3 *14*	4721.1	(19^+)	4092.2	(17^+)			
631.8[e] *10*	7.2 *6*	4968.5	21^-	4336.9	20^+	(E1+M2)	0.03 *3*	other Eγ: 630.5 In 1993Ol02. Iγ=7 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: A_2=−0.25 *11*, A_4=−0.04 *10*, I(30°)/I(90°)=0.56 *4* (1985Ba47).
637.0[d]		2279.3+y	J+9	1642.3+y	J+7			
638.4[e] *10*	9.3 *10*	5400.5	21^-	4762.7	19^-			
643.9[e] *10*	20.5 *8*	5612.3	23^-	4968.5	21^-	(E2)	0.00964	Iγ=20 for E(^{48}Ca)=201 MeV (1985Ba47).

Continued on next page (footnotes at end of table)

(HI,xnγ) 1995Fi01,1993Ol02,1985Ba47 (continued)

γ(^{168}Yb) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[f]	Comments
								Mult.: A_2=+0.26 *15*, A_4=−0.01 *15*, I(30°)/I(90°)=1.13 *3* (1985Ba47).
650.0[&] *3*	46.8 *8*	4336.9	20^+	3686.9	18^+	(E2)	0.00943	Iγ=48 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: A_2=+0.13 *5*, A_4=−0.03 *6*, I(30°)/I(90°)=1.16 *2* (1985Ba47).
651.8[b]	5.5 *14*	4786.1	(20^+)	4133.8	(18^+)			
656.6[e] *10*	8.4 *5*	5686.9	22^-	5030.3	20^-	(E2)	0.00922	Iγ=10 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.22 *7* (1985Ba47).
663.5[b]		1289.2+x	(24)	625.7+x	(22)			
666.1[b]	7.1 *10*	3797.5	(17)	3131.4	(15)			other Eγ: 669 *1* In 1995Fi01.
676.4[b]	1.4 *1*	5255.9	21^+	4579.5	19^+	(E2)	0.00861	Iγ=6 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.25 *12* (1985Ba47).
680.1[e] *10*	7.0 *6*	6080.6	23^-	5400.5	21^-			
683.5[b]	8.2 *14*	5404.6	(21^+)	4721.1	(19^+)			
686.8[e] *10*	5.8 *6*	4373.9	19^-	3686.9	18^+	(E1+M2)	0.027 *24*	Iγ=6 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=0.67 *5* (1985Ba47).
699.9[e] *10*	25.5 *7*	5036.9	22^+	4336.9	20^+	(E2)	0.00796	Iγ=21 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.26 *10* (1985Ba47).
702.4[e] *10*	17.7 *7*	6314.7	25^-	5612.3	23^-	(E2)	0.00790	Iγ=15 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.22 *11* (1985Ba47).
705.0[e] *5*	87.6 *2*	6391.9	24^-	5686.9	22^-	(E2)	0.00783	I_γ: the reported value and its precision appear to Be far too high, suggesting a typographical error; possibly 8.8 *2* was intended. Iγ=12 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.23 *12* (1985Ba47).
716.8[b]	9.0 *12*	4514.3	(19)	3797.5	(17)			
725.3[b]	5.0 *4*	5511.1	(22^+)	4786.1	(20^+)			
729.0[e] *10*	5.5 *6*	6809.6	25^-	6080.6	23^-			
729.8[b]	9.9 *3*	2019.0+x	(26)	1289.2+x	(24)			
738.7[b]	7.3 *12*	6143.3	(23^+)	5404.6	(21^+)			
747.9[e] *10*	6.0 *4*	3821.1	17^-	3073.1	16^+	(E1+M2)	0.021 *19*	Iγ=9 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: A_2=+0.51 *16*, A_4=+0.34 *17*, I(30°)/I(90°)=0.78 *9* (1985Ba47).
753.1[b]	1.2 *1*	6009.0	23^+	5255.9	21^+			Iγ=3 for E(^{48}Ca)=201 MeV (1985Ba47).
760.5[e] *10*	23.3 *8*	5797.4	24^+	5036.9	22^+	(E2)	0.00662	Iγ=23 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.14 *6* (1985Ba47).
764.0[e] *10*	7.1 *3*	7156	26^-	6391.9	24^-	(E2)	0.00655	Iγ=24 for E(^{48}Ca)=201 MeV (1985Ba47) for possible doublet. Mult.: I(30°)/I(90°)=1.25 *5* (1985Ba47) for possible doublet.
764.9[b]		6276.0	(24^+)	5511.1	(22^+)			
767.2[e] *10*	13.8 *8*	7081.9	27^-	6314.7	25^-	(E2)	0.00649	Iγ=14 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.72 *15* (1985Ba47).
772.8[b]	6.1 *12*	5287.1	(21)	4514.3	(19)			
783.1[b]	5.6 *2*	2802.1+x	(28)	2019.0+x	(26)			
789.8[e] *10*	4.9 *6*	7599.4	27^-	6809.6	25^-			
795.4[b]	7.0 *9*	6938.7	(25^+)	6143.3	(23^+)			
796.5[b]	7.0 *9*	7072.5	(26^+)	6276.0	(24^+)			
821.6[e] *10*	7.1 *8*	3310.2	15^-	2488.5	14^+	(E1+M2)	0.016 *15*	Iγ=8 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: A_2=−0.15 *21*, A_4=+0.05 *24*, I(30°)/I(90°)=0.78 *4* (1985Ba47).

Continued on next page (footnotes at end of table)

(HI,xnγ) 1995Fi01,1993Ol02,1985Ba47 (continued)

γ(^{168}Yb) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[f]	Comments
826.2[b]	24.7 *8*	6835	25^+	6009.0	23^+	(E2)	0.00553	I_γ: for 826.2γ+826.5γ+828.5γ multiplet. Iγ=15 for E(^{48}Ca)=201 MeV (1985Ba47) for contaminated G. Mult.: I(30°)/I(90°)=0.99 *3* (1985Ba47) for contaminated G.
826.5[e] *10*	24.7 *8*	6623.9	26^+	5797.4	24^+			I_γ: for 826.2γ+826.5γ+828.5γ multiplet. see comment on 826γ from 6833 level.
828.5[e] *10*	24.7 *8*	7984	28^-	7156	26^-			I_γ: for 826.2γ+826.5γ+828.5γ multiplet.
835.2[b]		6122	(23)	5287.1	(21)			
836.3[e] *10*	12.7 *8*	7918.2	29^-	7081.9	27^-	(E2)	0.00539	Iγ=9 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.13 *4* (1985Ba47).
839.5[b]		7912.0	(28^+)	7072.5	(26^+)			
842.4[b]	3.2 *2*	3644.5+x	(30)	2802.1+x	(28)			
853[e] *1*	3.8 *9*	7791.7	(27^+)	6938.7	(25^+)			
854.0[e] *10*	4.6 *4*	8453.4	29^-	7599.4	27^-			
889.3[b]		8801.3	(30^+)	7912.0	(28^+)			
891.4[b]	14.2 *3*	7727	27^+	6835	25^+	(E2)	0.00470	I_γ: combined value for 891.4γ and 893.0γ. see comment on 893γ from 7517 level.
893.0[e] *10*	14.2 *3*	7516.9	28^+	6623.9	26^+	(E2)	0.00469	I_γ: combined value for 891.4γ and 893.0γ. Iγ=14 for E(^{48}Ca)=201 MeV (1985Ba47) for doublet. Mult.: I(30°)/I(90°)=0.95 *6* (1985Ba47) for doublet.
896.0[e] *10*		8880	30^-	7984	28^-			
902[e] *1*	5.4 *15*	7024	(25)	6122	(23)			
904.4[b]	4.7 *2*	4548.9+x	(32)	3644.5+x	(30)			
906[e] *1*	2.4 *6*	8697.7	(29^+)	7791.7	(27^+)			
907.4[e] *10*	10.6 *4*	8825.6	31^-	7918.2	29^-	(E2)	0.00453	Iγ=12 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.16 *16* (1985Ba47).
910.4[e] *10*	9.3 *3*	2846.2	13^-	1935.9	12^+	(E1+M2)	0.012 *11*	Iγ=8 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: A_2=−0.22 *16*, A_4=+0.02 *20*, I(30°)/I(90°)=0.98 *18* (1985Ba47).
918.8[e] *10*	3.1 *4*	9372.2	31^-	8453.4	29^-			
944.2[b]	0.7 *1*	8671	29^+	7727	27^+			
947[e] *1*	2.4 *2*	9748.3	(32^+)	8801.3	(30^+)			
958.3[e] *10*	6.2 *2*	8475.2	30^+	7516.9	28^+	(E2)	0.00405	Iγ=3 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.85 *14* (1985Ba47).
960.5[e] *10*	2.5 *2*	9841	32^-	8880	30^-			
965[e] *1*	2.9 *1*	5514+x	(34)	4548.9+x	(32)			other Eγ: 966.5 (1993Ol02).
977.2[e] *10*	5.0 *4*	9803	33^-	8825.6	31^-	(E2)	0.00389	Iγ=6 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.29 *11* (1985Ba47).
980.7[e] *10*	3.6 *6*	10353	33^-	9372.2	31^-			
995[e] *1*	4.4 *1*	2930.9	13^+	1935.9	12^+			

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(HI,xnγ) 1995Fi01,1993Ol02,1985Ba47 (continued)

γ(^{168}Yb) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[f]	Comments
1012[e] *1*	1.4 *2*	10760	(34$^+$)	9748.3	(32$^+$)			
1016[e] *1*	3.6 *1*	1302.5	5$^+$	286.550	4$^+$			I_γ: for 1018γ+1016γ doublet. Iγ=3 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: A_2=+0.58 *7*, A_4=−0.02 *17*, I(30°)/I(90°)=1.36 *10* (1985Ba47) for doublet.
1018[e] *1*	3.6 *1*	2443.5	11$^+$	1425.45	10$^+$	(M1+E2)	0.0052 *17*	I_γ: for 1018γ+1016γ doublet. see comment on 1016γ from 1302 level.
1019[e] *1*		4092.2	(17$^+$)	3073.1	16$^+$			
1020.0[e] *10*	8.0 *2*	10861	34$^-$	9841	32$^-$			I_γ: probably for 1020.0γ+1020.4γ doublet.
1020.4[e] *10*	8.0 *2*	9496	32$^+$	8475.2	30$^+$			I_γ: probably for 1020.0γ+1020.4γ doublet.
1025[e] *1*	2.2 *1*	6539+x	(36)	5514+x	(34)			other Eγ: 1027 (1993Ol02).
1033[ge] *1*	9.7[g] *2*	1618.5	7$^+$	585.30	6$^+$			Iγ=7 for E(^{48}Ca)=201 MeV (1985Ba47) for doublet. Mult.: A_2=−0.26 *15*, I(30°)/I(90°)=1.09 *10* (1985Ba47) for doublet.
1033[ge] *1*	9.7[g] *2*	2002.9	9$^+$	970.05	8$^+$			see comment on 1033γ from 1618 level.
1034[e] *1*	6.3 *4*	4721.1	(19$^+$)	3686.9	18$^+$			
1035.2[e] *10*	6.3 *4*	11388	35$^-$	10353	33$^-$			
1044[e] *1*		3532.2	(15$^+$)	2488.5	14$^+$			
1045.7[e] *10*	3.6 *4*	10848	35$^-$	9803	33$^-$	(E2)	0.00339	Iγ=5 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.6 *4* (1985Ba47).
1060[e] *1*	2.5 *5*	4133.8	(18$^+$)	3073.1	16$^+$			
1063[e] *1*		5400.5	21$^-$	4336.9	20$^+$			
1070[e] *1*	1.6 *3*	11931	36$^-$	10861	34$^-$			
1076[e] *1*		4762.7	19$^-$	3686.9	18$^+$			
1079.1[e] *10*	2.5 *3*	10575	34$^+$	9496	32$^+$	(E2)	0.00318	Iγ=3 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.3 *7* (1985Ba47).
1081[e] *1*	1.2 *2*	11841	(36$^+$)	10760	(34$^+$)			
1084[e] *1*	0.9 *2*	7623+x	(38)	6539+x	(36)			other Eγ: 1087 (1993Ol02).
1092[e] *1*	3.2 *4*	4165.1	17$^-$	3073.1	16$^+$			
1092[e] *1*	0.8 *3*	13023	38$^-$	11931	36$^-$			
1099[e] *1*	2.8 *4*	4786.1	(20$^+$)	3686.9	18$^+$			
1110.3[e] *10*	2.5 *4*	11959	37$^-$	10848	35$^-$	(E2)	0.00300	Iγ=3 for E(^{48}Ca)=201 MeV (1985Ba47). Mult.: I(30°)/I(90°)=1.3 *5* (1985Ba47).
1115[e] *1*	0.7 *3*	14138	40$^-$	13023	38$^-$			
1125[e] *1*		3613.2	15$^-$	2488.5	14$^+$			
1128.6[e] *10*	1.5 *2*	11703	36$^+$	10575	34$^+$			
1131[e] *1*		15269	42$^-$	14138	40$^-$			
1143[b]		8766+x	(40)	7623+x	(38)			
1144[e] *1*	0.6 *2*	12985	(38$^+$)	11841	(36$^+$)			
1161[e] *1*	0.9 *2*	12864	38$^+$	11703	36$^+$			1993Ol02 did not observe this γ and placed the 1169γ from this level instead.

Continued on next page (footnotes at end of table)

(HI,xnγ) 1995Fi01,1993Ol02,1985Ba47 (continued)

γ(^{168}Yb) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Comments
1169[e] *1*	0.7 *2*	14033	40^+	12864	38^+	placement from 1995Fi01; 1993Ol02 placed it lower In cascade.
1169.7[e] *10*	1.9 *4*	13128	39^-	11959	37^-	
1174[e] *1*	3.9 *7*	5511.1	(22^+)	4336.9	20^+	
1195[e] *1*	0.5 *2*	15228	42^+	14033	40^+	
1205[e] *1*		14190	(40)	12985	(38^+)	
1215[e] *1*	0.7 *2*	15578	43^-	14362	41^-	see comment on 1234γ.
1229[eh] *1*		16457?	(44^+)	15228	42^+	
1234[e] *1*	0.9 *2*	14362	41^-	13128	39^-	placement from 1995Fi01; 1993Ol02 placed 1234γ and 1215γ In reverse order.
1236[a]		1820.7	6^+	585.30	6^+	
1266[a]		1552.5	4^+	286.550	4^+	
1268[eh]		16846?	(45^-)	15578	43^-	
1364[a]		1452.1	3^+	87.73	2^+	
1389[a]		1675.5	5^+	286.550	4^+	

[†] From ^{154}Sm(^{18}O,4nγ), ^{124}Sn(^{48}Ca,4nγ) (1985Ba47), except where noted.

[‡] Arbitrary units relative to Iγ(298.8γ)=100 (1995Fi01) for E(^{48}Ca)=210 MeV, except As noted. No Iγ data are given In 1993Ol02 or 1994Ol04. Iγ data from 1985Ba47 for E(^{48}Ca)=201 MeV are given In comments; these are averages from the 30° and 90° projected coincidence spectra and many values either could not be obtained at all or are subject to considerable uncertainty because of low intensity or proximity to other peaks. See 1985Ba47 for Iγ data for 17 lines obtained from (^{18}O,4nγ) singles spectra; see 1972Jo02 for Iγ for 8 lines obtained from (α,3nγ), E=43 MeV; see 1972Mo44 for Iγ In (α,2nγ), E=28 MeV (5 lines) and (^{12}C,4nγ) E=60 MeV (5 lines).

[#] Dipole or quadrupole character from γ(θ) in ^{154}Sm(^{18}O,4nγ) and/or ratios of γ-ray yields at 30° and 90° in ^{124}Sn(^{48}Ca,4nγ) and/or γ(θ) in (α,xnγ); known level structure from ^{168}Lu ε decay further restricts multipolarity possibilities. Q transitions within the g.s. band γ cascade with Eγ≤550 keV are assigned As E2 based on RUL and the observation In (α,3nγ) (1972Jo02) that none of them deexcites a level with $T_{1/2}$>20 ns. Δπ=(No) is assigned to other intraband Q transitions.

[@] From ^{167}Er(α,3nγ) (1972Jo02).

[&] From ^{166}Er, ^{170}Er(α,xnγ), ^{160}Gd(^{12}C,4nγ) (1972Mo44).

[a] From ^{166}Er(α,2nγ) (1982Wa19).

[b] From 1993Ol02; authors do not report uncertainty.

[c] From curved crystal diffraction in ^{169}Tm(p,2nγ), (d,3nγ) (1970Je09), quoted by 1972Jo02.

[d] From 1994Ol04; uncertainties not stated by authors.

[e] From ^{124}Sn(^{48}Ca,4nγ) (1995Fi01). authors report uncertainty of≤0.5 keV except for weak transitions and doublets; for the latter, uncertainties May rise to 1 keV. The evaluator assigns 0.5 keV uncertainty for well-resolved lines with Iγ>30, 1 keV for all others.

[f] 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.

[g] Multiply placed with undivided intensity.

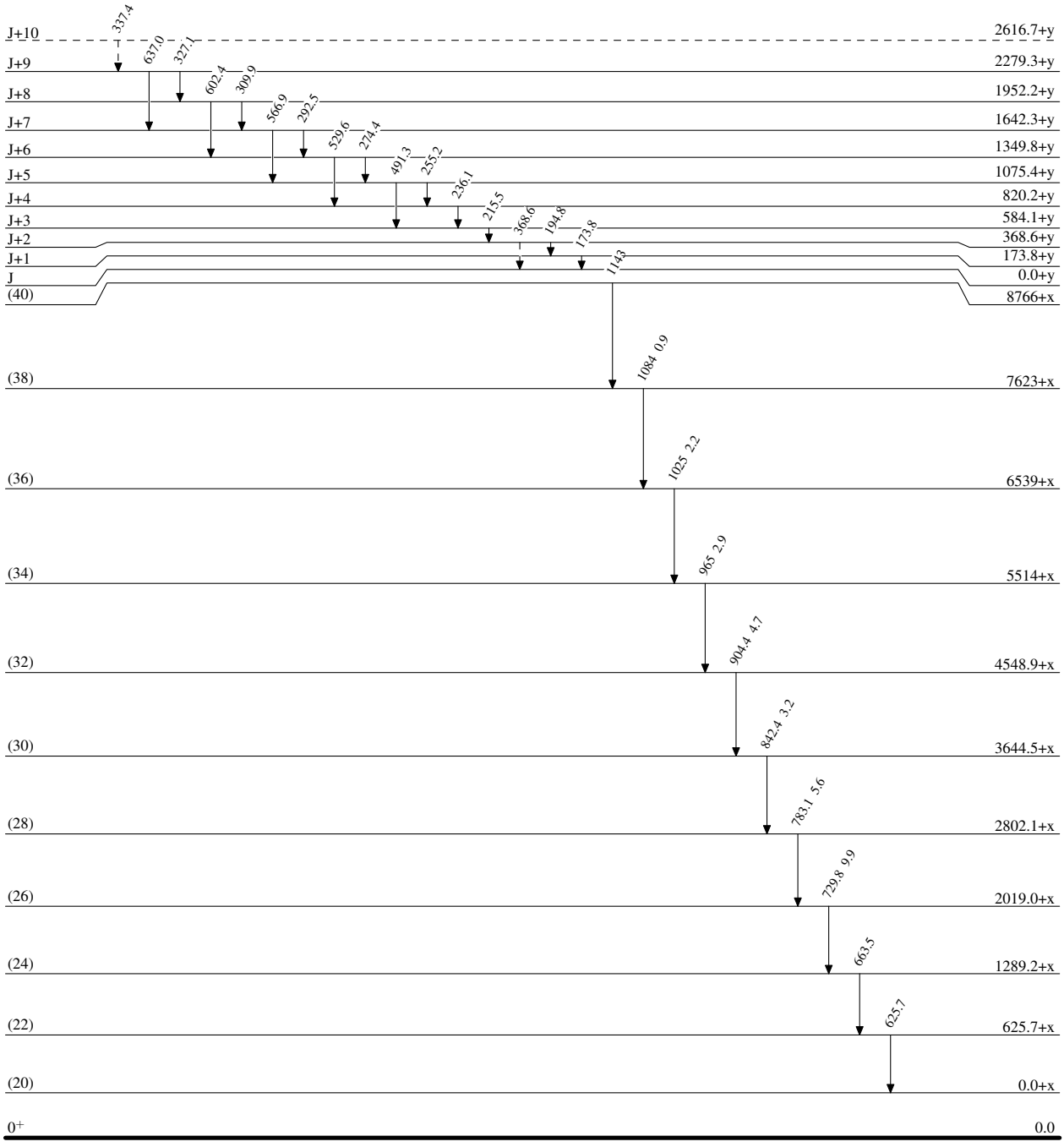
[h] Placement of transition in the level scheme is uncertain.

(HI,xnγ) 1995Fi01,1993Ol02,1985Ba47

Level Scheme

Intensities: Relative Iγ for ^{124}Sn(^{48}Ca,4nγ), E=210 MeV

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)



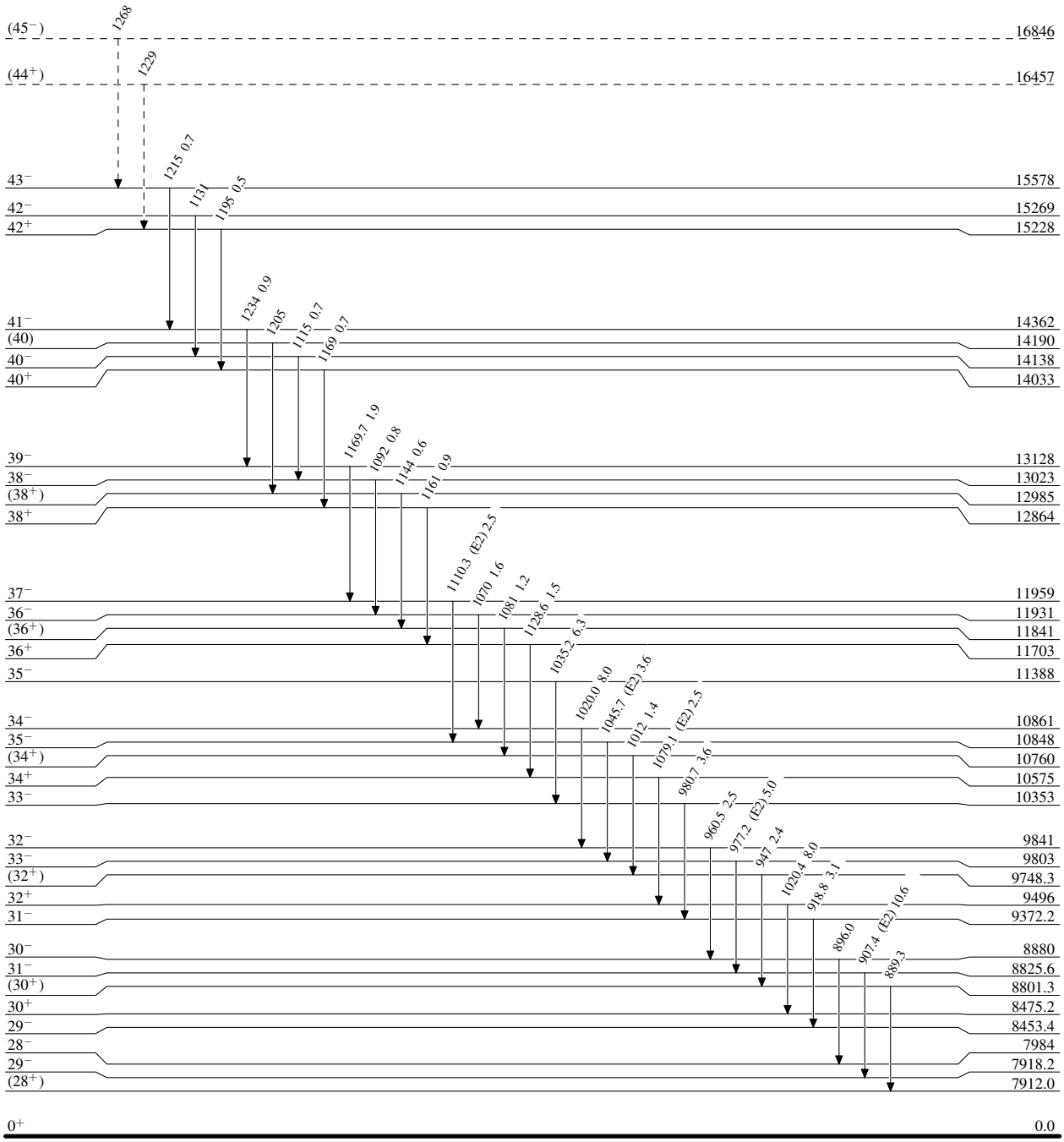
$^{168}_{70}Yb_{98}$

(HI,xnγ) 1995Fi01,1993Ol02,1985Ba47

Level Scheme (continued)

Intensities: Relative Iγ for $^{124}Sn(^{48}Ca,4n\gamma)$, E=210 MeV

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)



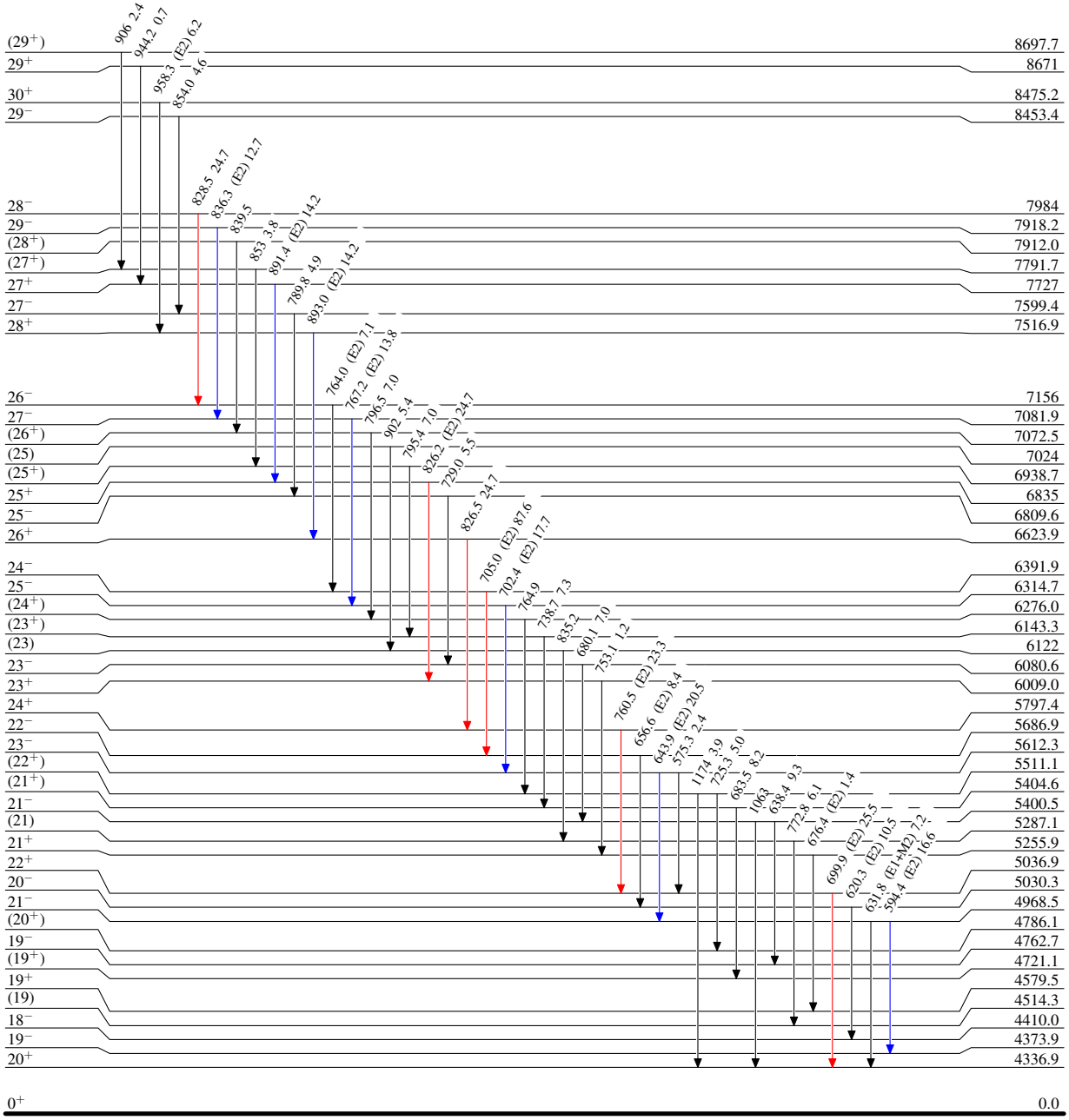
$^{168}_{70}Yb_{98}$

(HI,xnγ) 1995Fi01,1993Ol02,1985Ba47

Level Scheme (continued)

Intensities: Relative Iγ for ^{124}Sn(^{48}Ca,4nγ), E=210 MeV

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

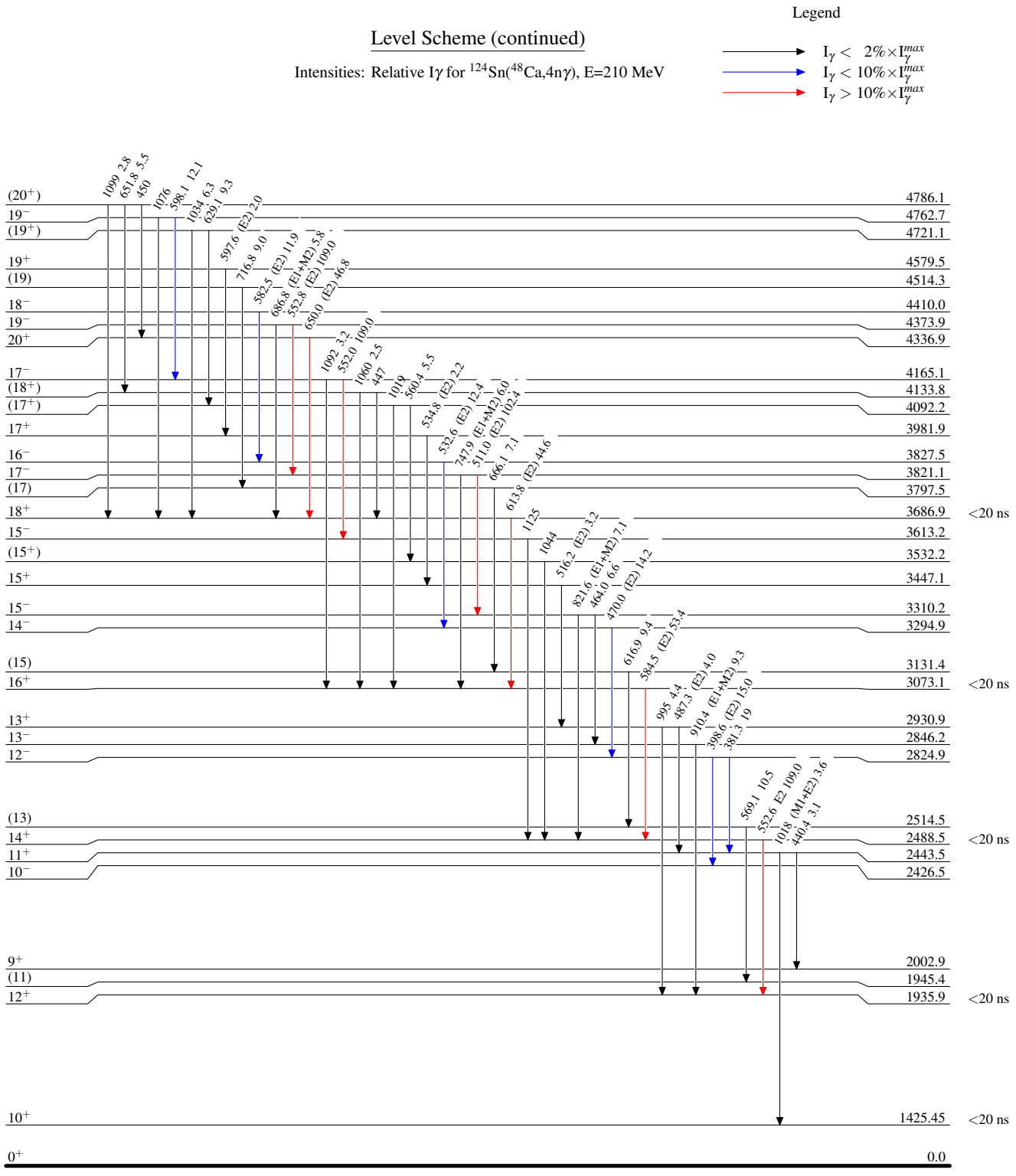


$^{168}_{70}Yb_{98}$

(HI,xnγ) 1995Fi01,1993Ol02,1985Ba47

Level Scheme (continued)

Intensities: Relative Iγ for ^{124}Sn(^{48}Ca,4nγ), E=210 MeV

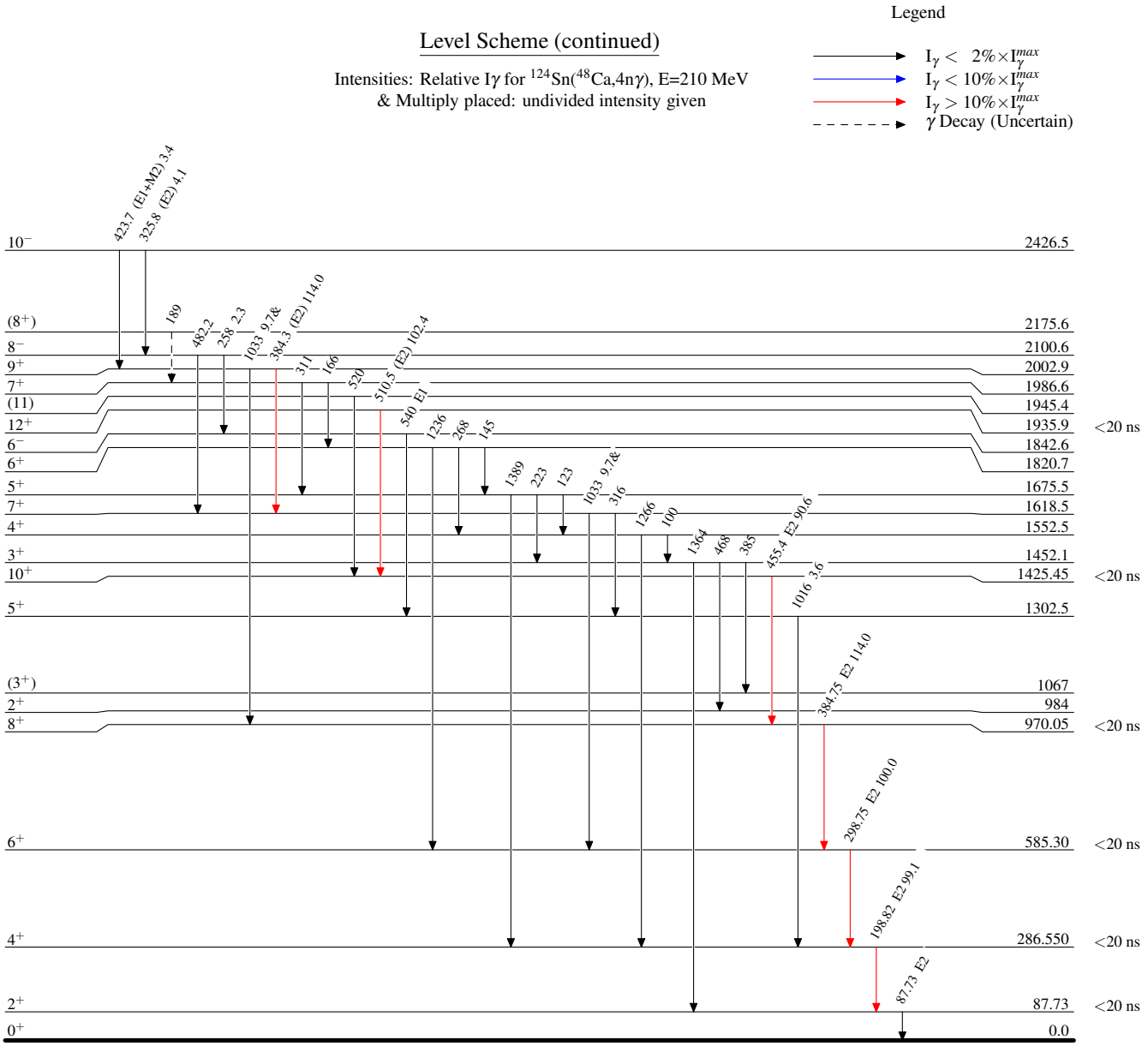


$^{168}_{70}Yb_{98}$

(HI,xnγ) 1995Fi01,1993Ol02,1985Ba47

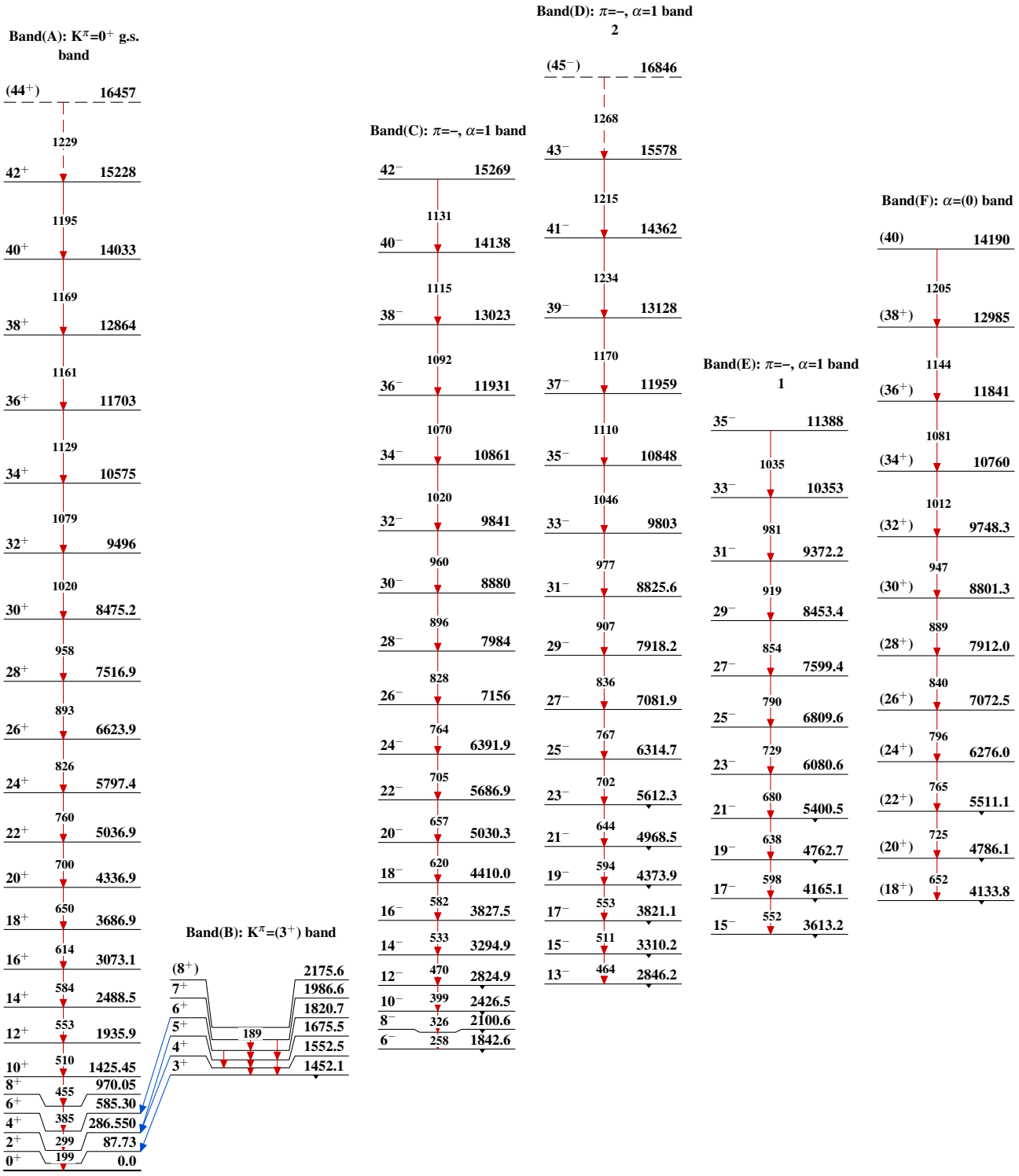
Level Scheme (continued)

Intensities: Relative Iγ for ^{124}Sn(^{48}Ca,4nγ), E=210 MeV
& Multiply placed: undivided intensity given

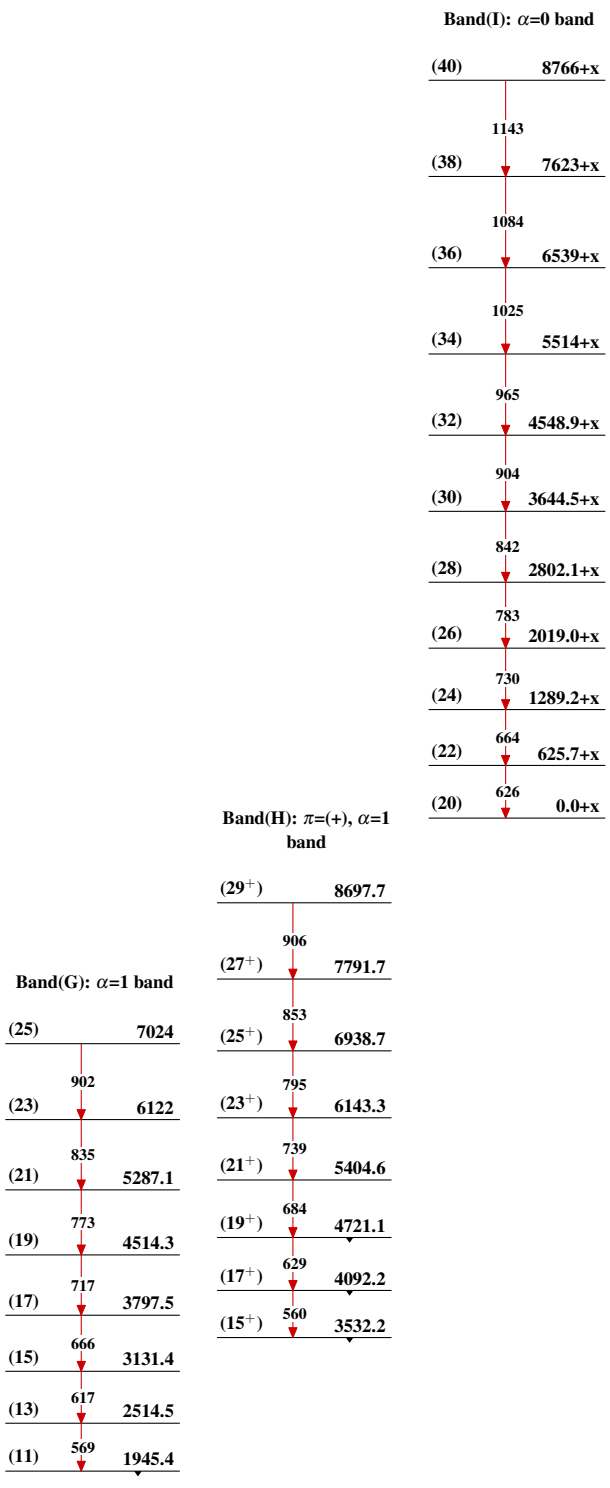


$^{168}_{70}Yb_{98}$

(HI,xnγ) 1995Fi01,1993Ol02,1985Ba47



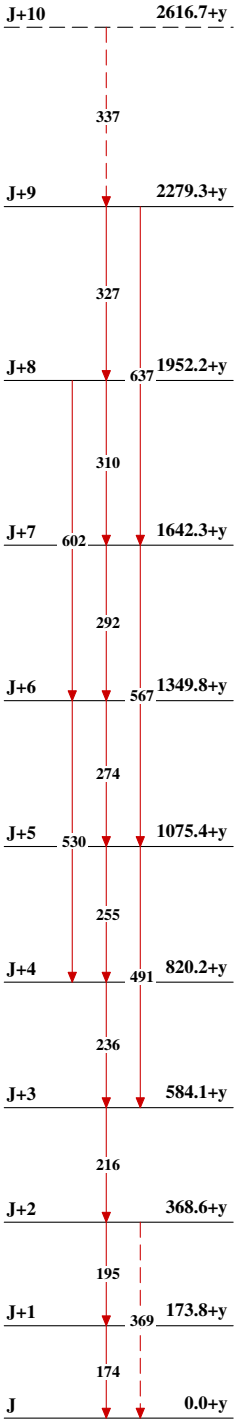
(HI,xnγ) 1995Fi01,1993Ol02,1985Ba47 (continued)



$^{168}_{70}Yb_{98}$

(HI,xnγ) 1995Fi01,1993Ol02,1985Ba47 (continued)

Band(J): M1 band (1994Ol04)



$^{168}_{70}Yb_{98}$