^{124}Sn(^{50}Ti,4nγ):SD **2006Ne03,2002Ne20,2013Sm02**

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. M. Baglin[1], E. A. Mccutchan[2], S. Basunia[1]	NDS 153, 1 (2018)	1-Oct-2018

Additional information 1.

2006Ne03: E=216 MeV. Measured Eγ, Iγ, $\gamma\gamma$ using EUROBALL spectrometer, composed of 210 BGO detectors, 29 tapered Ge detectors, 15 Cluster and 26 Clover composite Ge detectors. Deduced two triaxial SD bands and 13 normal-deformed bands.

2002Ne20: E=216 MeV; measured Eγ, $\gamma\gamma$, $\gamma\gamma(\theta)$(DCO) using EUROBALL array consisting of 29 single, tapered Ge detectors, 15 cluster and 26 clover composite detectors, each of them surrounded by a BGO anti-Compton shield. Inner ball of 210 BGO detectors was used as a multiplicity filter. Deduced triaxial SD band.

Levels and γ rays from the normal-deformed band data from 2006Ne03 have been included here only if needed to show connections between the SD-1 band and lower levels. Many new normal-deformed bands are reported in 2003NeZY and 2006Ne03.

^{170}Hf Levels

Nomenclature for quasiparticle Nilsson orbitals:
A: ν5/2[642], α=+1/2;
B: ν5/2[642], α=−1/2;
C: ν3/2[651], α=+1/2;
D: ν3/2[651], α=−1/2;
E: ν1/2[521], α=+1/2;
F: ν1/2[521], α=−1/2;
G: ν5/2[512], α=+1/2;
H: ν5/2[512], α=−1/2;
M: ν3/2[521], α=+1/2;
N: ν3/2[521], α=−1/2.

The population intensities of normal-deformed bands is from 3-12% of the reaction channel measured relative to the 321, 6^+ to 4^+ transition of the g.s. band.

E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]
0[#]	0^+	2384.6 *18*	$9^{(-)}$	3324.7[e] *18*	$14^{(-)}$	4214.5[i] *19*	$17^{(-)}$
101.0[#] *10*	2^+	2406.1[b] *25*	9^-	3423.7[c] *21*	$14^{(-)}$	4293.6[g] *19*	$17^{(-)}$
322.2[#] *14*	4^+	2476.6[c] *17*	$10^{(-)}$	3430.5[@] *19*	15^-	4338[a] *3*	16^-
643.3[#] *16*	6^+	2484.0[@] *19*	11^-	3460[b] *3*	13^-	4394.6[e] *20*	$18^{(-)}$
1043.6[#] *17*	8^+	2530.7[e] *17*	$10^{(-)}$	3532.6[j] *19*	16^+	4418.8[h] *20*	$18^{(-)}$
1088.8 *14*	$3^{(+)}$	2567.4[#] *18*	14^+	3538.2[d] *19*	$15^{(-)}$	4421.4[#] *19*	20^+
1373.0[i] *15*	$5^{(-)}$	2579.2[i] *18*	$11^{(-)}$	3578.0[f] *18*	$15^{(-)}$	4529.3[@] *19*	19^-
1505.4[#] *17*	10^+	2644.5[a] *25*	10^-	3611.5[&] *24*	(14^-)	4584.7[c] *25*	$18^{(-)}$
1564.6[c] *14*	$4^{(-)}$	2689.6[f] *18*	$11^{(-)}$	3636.6[i] *19*	$15^{(-)}$	4628[b] *3*	17^-
1726.2[i] *16*	$7^{(-)}$	2725.5[&] *19*	(10^-)	3717.9[g] *19*	$15^{(-)}$	4670.2[d] *24*	$19^{(-)}$
1774.3 *19*	6^+	2878.7[e] *17*	$12^{(-)}$	3750[a] *3*	14^-	4715.6[f] *20*	$19^{(-)}$
1799.7[c] *15*	$6^{(-)}$	2906.5[b] *25*	11^-	3767.1[#] *19*	18^+	4727[&] *3*	(18^-)
1967.3 *21*	7^+	2924.7[c] *18*	$12^{(-)}$	3810.7[h] *20*	$16^{(-)}$	4751.4[j] *20*	20^+
2016.5[#] *18*	12^+	2932.7[@] *19*	13^-	3834.5[e] *19*	$16^{(-)}$	4844.3[i] *20*	$19^{(-)}$
2109.5[c] *16*	$8^{(-)}$	3062.4[i] *18*	$13^{(-)}$	3965.5[@] *19*	17^-	4909.4[g] *19*	$19^{(-)}$
2131.0[i] *17*	$9^{(-)}$	3094.7[f] *18*	$13^{(-)}$	3983.7[c] *23*	$16^{(-)}$	4942[a] *3*	18^-
2150.1 *18*	(7^-)	3135.5[&] *22*	(12^-)	4043[b] *3*	15^-	4968.5[m] *20*	$19^{(-)}$
2183.3[a] *23*	8^-	3145.0[d] *19*	$13^{(-)}$	4062.2[d] *22*	$17^{(-)}$	4994.6[e] *21*	$20^{(-)}$
2254.9[e] *18*	$8^{(-)}$	3151.6[#] *19*	16^+	4093.7[j] *19*	18^+	5065.6[h] *20*	$20^{(-)}$
2349.6[f] *18*	$9^{(-)}$	3178[a] *3*	12^-	4123.7[f] *19*	$17^{(-)}$	5126.4[@] *20*	21^-
2384.5[&o] *22*	(8^-)	3196.7[g] *19*	$13^{(-)}$	4146[&] *3*	(16^-)	5130.5[#] *20*	22^+

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$^{124}Sn(^{50}Ti,4n\gamma)$:SD 2006Ne03,2002Ne20,2013Sm02 (continued)

^{170}Hf Levels (continued)

E(level)[†]	J^{π}[‡]	E(level)[†]	J^{π}[‡]
5223[c] *3*	$20^{(-)}$	8099[@] *3*	29^{-}
5268[b] *3*	19^{-}	8124[h] *3*	$28^{(-)}$
5343.6[f] *22*	$21^{(-)}$	8242[c] *4*	$28^{(-)}$
5353[&] *3*	(20^{-})	8282[m] *3*	$29^{(-)}$
5358[d] *3*	$21^{(-)}$	8346[&] *4*	(28^{-})
5482.4[j] *20*	22^{+}	8413[f] *4*	$29^{(-)}$
5506.4[m] *20*	$21^{(-)}$	8590[#] *3*	30^{+}
5526.4[i] *20*	$21^{(-)}$	8667[d] *4*	$29^{(-)}$
5622[a] *3*	20^{-}	8852[e] *3*	$30^{(-)}$
5638.6[e] *22*	$22^{(-)}$	8882[j] *3*	30^{+}
5757.5[h] *21*	$22^{(-)}$	9017[@] *3*	$31^{(-)}$
5770.4[@] *22*	23^{-}	9026[h] *3*	$30^{(-)}$
5898[c] *3*	$22^{(-)}$	9109[m] *3*	$31^{(-)}$
5902.9[#] *21*	24^{+}	9151[c] *4*	$30^{(-)}$
5995[b] *3*	21^{-}	9239[&] *4*	(30^{-})
6015.6[f] *24*	$23^{(-)}$	9346[f] *4*	$31^{(-)}$
6024[&] *3*	(22^{-})	9577[d] *4*	$31^{(-)}$
6118[d] *3*	$23^{(-)}$	9598[#] *3*	32^{+}
6128.4[m] *21*	$23^{(-)}$	9820[e] *4*	$32^{(-)}$
6263.4[i] *23*	$23^{(-)}$	9841[j] *3*	32^{+}
6267.2[j] *21*	24^{+}	9995[m] *3*	$33^{(-)}$
6339.6[e] *24*	$24^{(-)}$	9997[h] *3*	$32^{(-)}$
6387[a] *3*	22^{-}	10002[@] *4*	33^{-}
6477.4[@] *25*	25^{-}	10124[c] *4*	$32^{(-)}$
6499.5[h] *23*	$24^{(-)}$	10337[f] *4*	$33^{(-)}$
6619[c] *3*	$24^{(-)}$	10654[#] *3*	34^{+}
6738.9[#] *24*	26^{+}	10838[e] *4*	$34^{(-)}$
6746[f] *3*	$25^{(-)}$	10847[j] *3*	34^{+}
6747[&] *4*	(24^{-})	10941[m] *4*	$35^{(-)}$
6796.4[m] *23*	$25^{(-)}$	11029[h] *4*	$34^{(-)}$
6797[b] *3*	23^{-}	11049[@] *4*	35^{-}
6940[d] *3*	$25^{(-)}$	11141[c] *4*	$34^{(-)}$
7044.4[i] *25*	$25^{(-)}$	11368[f] *4*	$35^{(-)}$
7096.1[j] *22*	26^{+}	11750[#] *4*	36^{+}
7107[e] *3*	$26^{(-)}$	11889[e] *4*	$36^{(-)}$
7224[a] *3*	24^{-}	11902[j] *4*	36^{+}
7252[@] *3*	27^{-}	11944[m] *4*	$37^{(-)}$
7286.5[h] *25*	$26^{(-)}$	12109[h] *4*	$36^{(-)}$
7398[c] *4*	$26^{(-)}$	12146[@] *4*	37^{-}
7512.5[m] *25*	$27^{(-)}$	12406[f] *4*	$37^{(-)}$
7521[&] *4*	(26^{-})	12880[#] *4*	38^{+}
7545[f] *4*	$27^{(-)}$	12951[e] *4*	$38^{(-)}$
7636[#] *3*	28^{+}	12985[j] *4*	38^{+}
7800[d] *4*	$27^{(-)}$	13003[m] *4*	$39^{(-)}$
7868[i] *3*	$27^{(-)}$	13277[@] *4*	39^{-}
7945[e] *3*	$28^{(-)}$	14025[e] *4*	$40^{(-)}$
7967.1[j] *24*	28^{+}	14031[#] *4*	40^{+}

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^{124}Sn(^{50}Ti,4nγ):SD 2006Ne03,2002Ne20,2013Sm02 (continued)

^{170}Hf Levels (continued)

E(level)[†]	J^{π}[‡]	Comments
14116[m] 4	$41^{(-)}$	
15283[m] 4	$43^{(-)}$	
16503[m] 4	$45^{(-)}$	
17775[m] 4	$47^{(-)}$	
19100[m] 5	$49^{(-)}$	
0+x[l]	J	Additional information 2.
239.0+x[k] 8	J+1	
504.0+x[l] 8	J+2	
790.0+x[k] 10	J+3	
1095.0+x[l] 11	J+4	
1413.0+x[k] 12	J+5	
1743.0+x[l] 13	J+6	
2079.0+x[k] 13	J+7	
2419.0+x[l] 14	J+8	
2763.0+x[k] 15	J+9	
3116.0+x[l] 15	J+10	
3482.0+x[k] 16	J+11	
3862.0+x[l] 17	J+12	
y[n]	J1≈24	Additional information 3. E(level): y ≈ 400 keV above the yrast band. J^{π}: J_1≈(22:24) was proposed In 2002Ne20 but, In 2006Ne03, the authors suggest much higher spin of ≈40 when comparing results of a high spin band In ^{175}Hf.
722.6+y[n] 5	J1+2	
1497.8+y[n] 7	J1+4	
2328.3+y[n] 8	J1+6	
3213.5+y[n] 9	J1+8	
4153.3+y[n] 9	J1+10	
5145.4+y[n] 10	J1+12	
6188.6+y[n] 10	J1+14	
7283.6+y[n] 11	J1+16	
8434.7+y[n] 11	J1+18	
9644.8+y[n] 15	J1+20	

† From least-squares fit to Eγ, assuming Δ(Eγ)=1 keV for each γ ray.

‡ As proposed by 2006Ne03 based on band structure, possible angular correlation data and comparison with cranked shell-model calculations.

Band(A): g.s. Band. At higher frequencies (around J=16), configuration becomes AB.

@ Band(B): AE to ABCE band.

& Band(C): AF to ABCF band, α=0.

a Band(D): Band built on 8^-, α=0.

b Band(d): Band built on 9^-, α=1.

c Band(E): α=0 band built on $4^{(-)}$.

d Band(e): α=1 band built on (7^-).

e Band(F): AH to ABCH band, α=0.

f Band(f): AG to ABCG band, α=1.

g Band(G): Band based on $13^{(-)}$.

h Band(H): AN to ABCN band, α=0.

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^{124}Sn(^{50}Ti,4nγ):SD 2006Ne03,2002Ne20,2013Sm02 (continued)

^{170}Hf Levels (continued)

[i] Band(h): AM to ABCM band, α=1.
[j] Band(I): BC to ABCD band.
[k] Band(J): Strongly-coupled ΔJ=2 band.
[l] Band(j): Strongly-coupled ΔJ=2 band.
[m] Band(K): Triaxial SD-1 band (2006Ne03). Percent population≈8. Band observed also In (HI,xnγ) by 1989IrZZ, but authors proposed J values there that were 2 units lower than recommended by 2006Ne03 and shown here.
[n] Band(L): Triaxial SD-2 band (2002Ne20,2006Ne03). Band population=0.9% *4* relative to the population of the yrast band.
[o] No transition has been observed to deexcite this level.

γ(^{170}Hf)

DCO data for SD-2 band are from 2003NeZY.

E_γ [†]	E_i(level)	J_i^π	E_f	J_f^π
101	101.0	2^+	0	0^+
105	2254.9	$8^{(-)}$	2150.1	(7^-)
146	2530.7	$10^{(-)}$	2384.6	$9^{(-)}$
189	2878.7	$12^{(-)}$	2689.6	$11^{(-)}$
193	1967.3	7^+	1774.3	6^+
216	2183.3	8^-	1967.3	7^+
216	3094.7	$13^{(-)}$	2878.7	$12^{(-)}$
221	322.2	4^+	101.0	2^+
223	2406.1	9^-	2183.3	8^-
230	3324.7	$14^{(-)}$	3094.7	$13^{(-)}$
235	1799.7	$6^{(-)}$	1564.6	$4^{(-)}$
238	2644.5	10^-	2406.1	9^-
239	239.0+x	J+1	0+x	J
253	3578.0	$15^{(-)}$	3324.7	$14^{(-)}$
256	3834.5	$16^{(-)}$	3578.0	$15^{(-)}$
262	2906.5	11^-	2644.5	10^-
265	504.0+x	J+2	239.0+x	J+1
271	4394.6	$18^{(-)}$	4123.7	$17^{(-)}$
272	3178	12^-	2906.5	11^-
276	2530.7	$10^{(-)}$	2254.9	$8^{(-)}$
279	4994.6	$20^{(-)}$	4715.6	$19^{(-)}$
282	3460	13^-	3178	12^-
286	790.0+x	J+3	504.0+x	J+2
289	3750	14^-	3460	13^-
289	4123.7	$17^{(-)}$	3834.5	$16^{(-)}$
290	4628	17^-	4338	16^-
293	4043	15^-	3750	14^-
295	4338	16^-	4043	15^-
295	5638.6	$22^{(-)}$	5343.6	$21^{(-)}$
305	1095.0+x	J+4	790.0+x	J+3
310	2109.5	$8^{(-)}$	1799.7	$6^{(-)}$
314	4942	18^-	4628	17^-
318	1413.0+x	J+5	1095.0+x	J+4
321	643.3	6^+	322.2	4^+
326	5268	19^-	4942	18^-
327	4093.7	18^+	3767.1	18^+
330	1743.0+x	J+6	1413.0+x	J+5
330	4751.4	20^+	4421.4	20^+
336	2079.0+x	J+7	1743.0+x	J+6
340	2419.0+x	J+8	2079.0+x	J+7
340	2689.6	$11^{(-)}$	2349.6	$9^{(-)}$
341	2725.5	(10^-)	2384.5	(8^-)
344	2763.0+x	J+9	2419.0+x	J+8
348	2878.7	$12^{(-)}$	2530.7	$10^{(-)}$
352	5482.4	22^+	5130.5	22^+
353	3116.0+x	J+10	2763.0+x	J+9
353	1726.2	$7^{(-)}$	1373.0	$5^{(-)}$
354	5622	20^-	5268	19^-
364	6267.2	24^+	5902.9	24^+
366	3482.0+x	J+11	3116.0+x	J+10
367	2476.6	$10^{(-)}$	2109.5	$8^{(-)}$
373	5995	21^-	5622	20^-
380	3862.0+x	J+12	3482.0+x	J+11
380	4909.4	$19^{(-)}$	4529.3	19^-
380	5506.4	$21^{(-)}$	5126.4	21^-
381	3532.6	16^+	3151.6	16^+
383	2109.5	$8^{(-)}$	1726.2	$7^{(-)}$
392	6387	22^-	5995	21^-
393	3538.2	$15^{(-)}$	3145.0	$13^{(-)}$
394	2924.7	$12^{(-)}$	2530.7	$10^{(-)}$
400	1043.6	8^+	643.3	6^+
402	2878.7	$12^{(-)}$	2476.6	$10^{(-)}$
405	2131.0	$9^{(-)}$	1726.2	$7^{(-)}$
405	3094.7	$13^{(-)}$	2689.6	$11^{(-)}$
410	3135.5	(12^-)	2725.5	(10^-)
410	6797	23^-	6387	22^-
427	1799.7	$6^{(-)}$	1373.0	$5^{(-)}$
427	7224	24^-	6797	23^-
446	3324.7	$14^{(-)}$	2878.7	$12^{(-)}$
448	2579.2	$11^{(-)}$	2131.0	$9^{(-)}$
448	2924.7	$12^{(-)}$	2476.6	$10^{(-)}$
449	2932.7	13^-	2484.0	11^-
461	2644.5	10^-	2183.3	8^-
462	1505.4	10^+	1043.6	8^+
476	1564.6	$4^{(-)}$	1088.8	$3^{(+)}$
476	3538.2	$15^{(-)}$	3062.4	$13^{(-)}$

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^{124}Sn(^{50}Ti,4nγ):SD 2006Ne03,2002Ne20,2013Sm02 (continued)

γ(^{170}Hf) (continued)

E_γ †	E_i(level)	J^π_i	E_f	J^π_f
476	3611.5	(14$^-$)	3135.5	(12$^-$)
483	3062.4	13$^{(-)}$	2579.2	11$^{(-)}$
483	3578.0	15$^{(-)}$	3094.7	13$^{(-)}$
492	3636.6	15$^{(-)}$	3145.0	13$^{(-)}$
498	3430.5	15$^-$	2932.7	13$^-$
499	3423.7	14$^{(-)}$	2924.7	12$^{(-)}$
501	2906.5	11$^-$	2406.1	9$^-$
504	504.0+x	J+2	0+x	J
510	3834.5	16$^{(-)}$	3324.7	14$^{(-)}$
511	2016.5	12$^+$	1505.4	10$^+$
521	3717.9	15$^{(-)}$	3196.7	13$^{(-)}$
524	4062.2	17$^{(-)}$	3538.2	15$^{(-)}$
533	3178	12$^-$	2644.5	10$^-$
534	4146	(16$^-$)	3611.5	(14$^-$)
535	3965.5	17$^-$	3430.5	15$^-$
538	5506.4	21$^{(-)}$	4968.5	19$^{(-)}$
546	4123.7	17$^{(-)}$	3578.0	15$^{(-)}$
551	790.0+x	J+3	239.0+x	J+1
551	2567.4	14$^+$	2016.5	12$^+$
554	3460	13$^-$	2906.5	11$^-$
560	3983.7	16$^{(-)}$	3423.7	14$^{(-)}$
560	4394.6	18$^{(-)}$	3834.5	16$^{(-)}$
561	4093.7	18$^+$	3532.6	16$^+$
564	4529.3	19$^-$	3965.5	17$^-$
566	3145.0	13$^{(-)}$	2579.2	11$^{(-)}$
572	3750	14$^-$	3178	12$^-$
574	3636.6	15$^{(-)}$	3062.4	13$^{(-)}$
576	4293.6	17$^{(-)}$	3717.9	15$^{(-)}$
578	4214.5	17$^{(-)}$	3636.6	15$^{(-)}$
581	4727	(18$^-$)	4146	(16$^-$)
582	4043	15$^-$	3460	13$^-$
584	3151.6	16$^+$	2567.4	14$^+$
585	4628	17$^-$	4043	15$^-$
588	4338	16$^-$	3750	14$^-$
591	1095.0+x	J+4	504.0+x	J+2
592	4715.6	19$^{(-)}$	4123.7	17$^{(-)}$
597	5126.4	21$^-$	4529.3	19$^-$
597	5506.4	21$^{(-)}$	4909.4	19$^{(-)}$
600	4994.6	20$^{(-)}$	4394.6	18$^{(-)}$
601	4584.7	18$^{(-)}$	3983.7	16$^{(-)}$
604	4942	18$^-$	4338	16$^-$
608	4418.8	18$^{(-)}$	3810.7	16$^{(-)}$
608	4670.2	19$^{(-)}$	4062.2	17$^{(-)}$
615	3767.1	18$^+$	3151.6	16$^+$
616	2725.5	(10$^-$)	2109.5	8$^{(-)}$
616	4909.4	19$^{(-)}$	4293.6	17$^{(-)}$
622	6128.4	23$^{(-)}$	5506.4	21$^{(-)}$
623	1413.0+x	J+5	790.0+x	J+3
626	5353	(20$^-$)	4727	(18$^-$)
627	5757.5	22$^{(-)}$	5130.5	22$^+$
628	5343.6	21$^{(-)}$	4715.6	19$^{(-)}$
630	4844.3	19$^{(-)}$	4214.5	17$^{(-)}$
638	5223	20$^{(-)}$	4584.7	18$^{(-)}$

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^{124}Sn(^{50}Ti,4nγ):SD 2006Ne03,2002Ne20,2013Sm02 (continued)

γ(^{170}Hf) (continued)

E_γ†	E_i(level)	J_i^π	E_f	J_f^π	Comments
640	5268	19^-	4628	17^-	
644	5065.6	$20^{(-)}$	4421.4	20^+	
644	5638.6	$22^{(-)}$	4994.6	$20^{(-)}$	
644	5770.4	23^-	5126.4	21^-	
647	5065.6	$20^{(-)}$	4418.8	$18^{(-)}$	
648	1743.0+x	J+6	1095.0+x	J+4	
652	4418.8	$18^{(-)}$	3767.1	18^+	
654	4421.4	20^+	3767.1	18^+	
658	4751.4	20^+	4093.7	18^+	
659	3810.7	$16^{(-)}$	3151.6	16^+	
666	2079.0+x	J+7	1413.0+x	J+5	
668	6796.4	$25^{(-)}$	6128.4	$23^{(-)}$	
671	6024	(22^-)	5353	(20^-)	
672	6015.6	$23^{(-)}$	5343.6	$21^{(-)}$	
675	4968.5	$19^{(-)}$	4293.6	$17^{(-)}$	
675	5898	$22^{(-)}$	5223	$20^{(-)}$	
676	2419.0+x	J+8	1743.0+x	J+6	
680	5622	20^-	4942	18^-	
682	5526.4	$21^{(-)}$	4844.3	$19^{(-)}$	
684	2763.0+x	J+9	2079.0+x	J+7	
688	5358	$21^{(-)}$	4670.2	$19^{(-)}$	
692	5757.5	$22^{(-)}$	5065.6	$20^{(-)}$	
697	3116.0+x	J+10	2419.0+x	J+8	
701	6339.6	$24^{(-)}$	5638.6	$22^{(-)}$	
705	5126.4	21^-	4421.4	20^+	
707	6477.4	25^-	5770.4	23^-	
709	5130.5	22^+	4421.4	20^+	
716	7512.5	$27^{(-)}$	6796.4	$25^{(-)}$	
719	3482.0+x	J+11	2763.0+x	J+9	
721	6619	$24^{(-)}$	5898	$22^{(-)}$	
722.6 *5*	722.6+y	J1+2	y	J1≈24	DCO=1.08 *25*
723	6747	(24^-)	6024	(22^-)	
727	5995	21^-	5268	19^-	
730	6746	$25^{(-)}$	6015.6	$23^{(-)}$	
731	5482.4	22^+	4751.4	20^+	
737	6263.4	$23^{(-)}$	5526.4	$21^{(-)}$	
742	6499.5	$24^{(-)}$	5757.5	$22^{(-)}$	
746	3862.0+x	J+12	3116.0+x	J+10	
760	6118	$23^{(-)}$	5358	$21^{(-)}$	
762	4529.3	19^-	3767.1	18^+	
765	6387	22^-	5622	20^-	
767	7107	$26^{(-)}$	6339.6	$24^{(-)}$	
770	8282	$29^{(-)}$	7512.5	$27^{(-)}$	
772	5902.9	24^+	5130.5	22^+	
774	7521	(26^-)	6747	(24^-)	
775	7252	27^-	6477.4	25^-	
775.2 *5*	1497.8+y	J1+4	722.6+y	J1+2	DCO=1.14 *29*
779	7398	$26^{(-)}$	6619	$24^{(-)}$	
781	7044.4	$25^{(-)}$	6263.4	$23^{(-)}$	
785	6267.2	24^+	5482.4	22^+	
787	7286.5	$26^{(-)}$	6499.5	$24^{(-)}$	
798	7545	$27^{(-)}$	6746	$25^{(-)}$	
802	6797	23^-	5995	21^-	

Continued on next page (footnotes at end of table)

^{124}Sn(^{50}Ti,4nγ):SD 2006Ne03,2002Ne20,2013Sm02 (continued)

γ(^{170}Hf) (continued)

E_γ†	I_γ†	E_i(level)	J^π_i	E_f	J^π_f	Comments
814		3965.5	17^-	3151.6	16^+	
822		6940	$25^{(-)}$	6118	$23^{(-)}$	
824		7868	$27^{(-)}$	7044.4	$25^{(-)}$	
825		8346	(28^-)	7521	(26^-)	
827		9109	$31^{(-)}$	8282	$29^{(-)}$	
829		7096.1	26^+	6267.2	24^+	
830.5 *3*	1.00	2328.3+y	J1+6	1497.8+y	J1+4	DCO=1.30 *21*
836		6738.9	26^+	5902.9	24^+	
837		7224	24^-	6387	22^-	
837		8124	$28^{(-)}$	7286.5	$26^{(-)}$	
838		7945	$28^{(-)}$	7107	$26^{(-)}$	
844		8242	$28^{(-)}$	7398	$26^{(-)}$	
847		8099	29^-	7252	27^-	
860		7800	$27^{(-)}$	6940	$25^{(-)}$	
863		3430.5	15^-	2567.4	14^+	
867		8667	$29^{(-)}$	7800	$27^{(-)}$	
868		8413	$29^{(-)}$	7545	$27^{(-)}$	
871		7967.1	28^+	7096.1	26^+	
885.2 *3*	0.86 *10*	3213.5+y	J1+8	2328.3+y	J1+6	DCO=1.1 *5* E_γ: 887 In level scheme In fig. 3 of 2006Ne03.
886		9995	$33^{(-)}$	9109	$31^{(-)}$	
893		9239	(30^-)	8346	(28^-)	
897		7636	28^+	6738.9	26^+	
902		9026	$30^{(-)}$	8124	$28^{(-)}$	
907		8852	$30^{(-)}$	7945	$28^{(-)}$	
909		9151	$30^{(-)}$	8242	$28^{(-)}$	
910		9577	$31^{(-)}$	8667	$29^{(-)}$	
915		8882	30^+	7967.1	28^+	
916		2932.7	13^-	2016.5	12^+	
918		9017	$31^{(-)}$	8099	29^-	
933		9346	$31^{(-)}$	8413	$29^{(-)}$	
939.8 *3*	0.96 *13*	4153.3+y	J1+10	3213.5+y	J1+8	
940‡		10941	$35^{(-)}$	10002	33^-	
942		4093.7	18^+	3151.6	16^+	
944		4909.4	$19^{(-)}$	3965.5	17^-	
946		10941	$35^{(-)}$	9995	$33^{(-)}$	
954		8590	30^+	7636	28^+	
959		9841	32^+	8882	30^+	
965		3532.6	16^+	2567.4	14^+	
968		9820	$32^{(-)}$	8852	$30^{(-)}$	
971		9997	$32^{(-)}$	9026	$30^{(-)}$	
972		4123.7	$17^{(-)}$	3151.6	16^+	
973		10124	$32^{(-)}$	9151	$30^{(-)}$	
979		2484.0	11^-	1505.4	10^+	
980‡		9995	$33^{(-)}$	9017	$31^{(-)}$	
984		4751.4	20^+	3767.1	18^+	
985		10002	33^-	9017	$31^{(-)}$	
988		1088.8	$3^{(+)}$	101.0	2^+	
991		10337	$33^{(-)}$	9346	$31^{(-)}$	
992.1 *3*	0.81 *11*	5145.4+y	J1+12	4153.3+y	J1+10	DCO=1.14 *17*
998		6128.4	$23^{(-)}$	5130.5	22^+	
1003		11944	$37^{(-)}$	10941	$35^{(-)}$	
1006		10847	34^+	9841	32^+	

Continued on next page (footnotes at end of table)

^{124}Sn(^{50}Ti,4nγ):SD 2006Ne03,2002Ne20,2013Sm02 (continued)

γ(^{170}Hf) (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Comments
1008		9598	32^+	8590	30^+	
1011		3578.0	$15^{(-)}$	2567.4	14^+	
1017		11141	$34^{(-)}$	10124	$32^{(-)}$	
1018		10838	$34^{(-)}$	9820	$32^{(-)}$	
1031		11368	$35^{(-)}$	10337	$33^{(-)}$	
1032		11029	$34^{(-)}$	9997	$32^{(-)}$	
1038		12406	$37^{(-)}$	11368	$35^{(-)}$	
1043.2 *3*	0.75 *11*	6188.6+y	J1+14	5145.4+y	J1+12	E_γ: 1044 In level scheme In fig. 3 of 2006Ne03.
1046		3062.4	$13^{(-)}$	2016.5	12^+	
1047		11049	35^-	10002	33^-	
1051		1373.0	$5^{(-)}$	322.2	4^+	
1051		11889	$36^{(-)}$	10838	$34^{(-)}$	
1055		11902	36^+	10847	34^+	
1056		10654	34^+	9598	32^+	
1059		13003	$39^{(-)}$	11944	$37^{(-)}$	
1061		5482.4	22^+	4421.4	20^+	
1062‡		12951	$38^{(-)}$	11889	$36^{(-)}$	
1063		4214.5	$17^{(-)}$	3151.6	16^+	
1069		3636.6	$15^{(-)}$	2567.4	14^+	
1074		2579.2	$11^{(-)}$	1505.4	10^+	
1074‡		14025	$40^{(-)}$	12951	$38^{(-)}$	
1077		4844.3	$19^{(-)}$	3767.1	18^+	
1078		3094.7	$13^{(-)}$	2016.5	12^+	
1080		12109	$36^{(-)}$	11029	$34^{(-)}$	
1083		1726.2	$7^{(-)}$	643.3	6^+	
1083		12985	38^+	11902	36^+	
1085		5506.4	$21^{(-)}$	4421.4	20^+	
1087		2131.0	$9^{(-)}$	1043.6	8^+	
1095.0 *3*	0.63 *8*	7283.6+y	J1+16	6188.6+y	J1+14	
1096		11750	36^+	10654	34^+	
1097		12146	37^-	11049	35^-	
1105		5526.4	$21^{(-)}$	4421.4	20^+	
1113		14116	$41^{(-)}$	13003	$39^{(-)}$	
1130		12880	38^+	11750	36^+	
1131		1774.3	6^+	643.3	6^+	
1131		13277	39^-	12146	37^-	
1137		6267.2	24^+	5130.5	22^+	
1142		4293.6	$17^{(-)}$	3151.6	16^+	
1142		4909.4	$19^{(-)}$	3767.1	18^+	
1151		3717.9	$15^{(-)}$	2567.4	14^+	
1151		14031	40^+	12880	38^+	
1151.1 *3*	0.46 *7*	8434.7+y	J1+18	7283.6+y	J1+16	
1167		15283	$43^{(-)}$	14116	$41^{(-)}$	
1180		3196.7	$13^{(-)}$	2016.5	12^+	
1184		2689.6	$11^{(-)}$	1505.4	10^+	
1193		7096.1	26^+	5902.9	24^+	
1210.1 *10*	0.35 *7*	9644.8+y	J1+20	8434.7+y	J1+18	
1220		16503	$45^{(-)}$	15283	$43^{(-)}$	
1242		1564.6	$4^{(-)}$	322.2	4^+	
1272		17775	$47^{(-)}$	16503	$45^{(-)}$	
1306		2349.6	$9^{(-)}$	1043.6	8^+	
1325		19100	$49^{(-)}$	17775	$47^{(-)}$	

Continued on next page (footnotes at end of table)

^{124}Sn(^{50}Ti,4nγ):SD 2006Ne03,2002Ne20,2013Sm02 (continued)

γ(^{170}Hf) (continued)

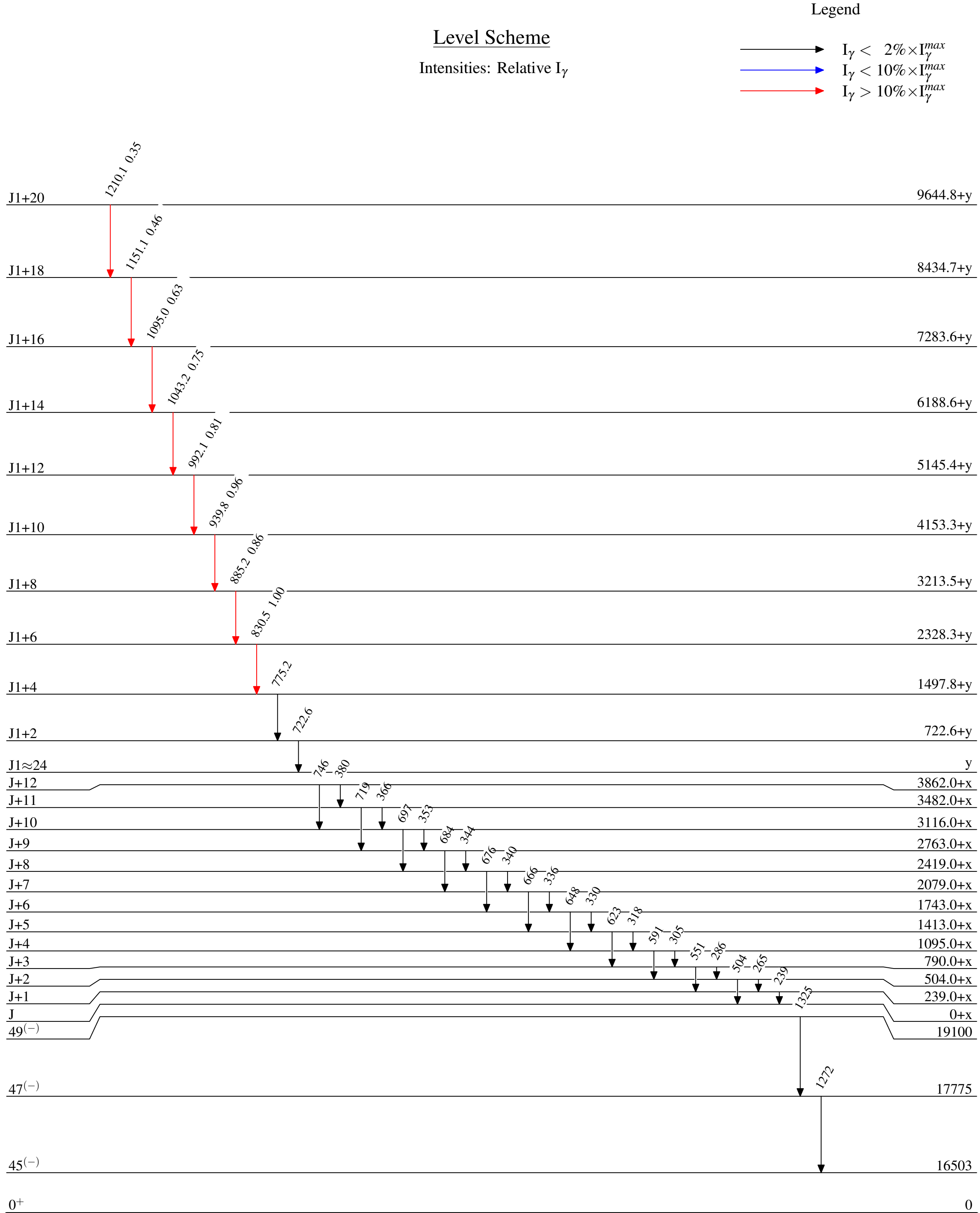
E_γ †	E_i(level)	J_i^π	E_f	J_f^π
1341	2384.6	$9^{(-)}$	1043.6	8^+
1507	2150.1	(7^-)	643.3	6^+

† From 2003NeZY. Intensities are from gates set on 722.6γ+775.2γ doublet.
‡ Placement of transition in the level scheme is uncertain.

$^{124}Sn(^{50}Ti,4n\gamma)$:SD 2006Ne03,2002Ne20,2013Sm02

Level Scheme

Intensities: Relative I_γ



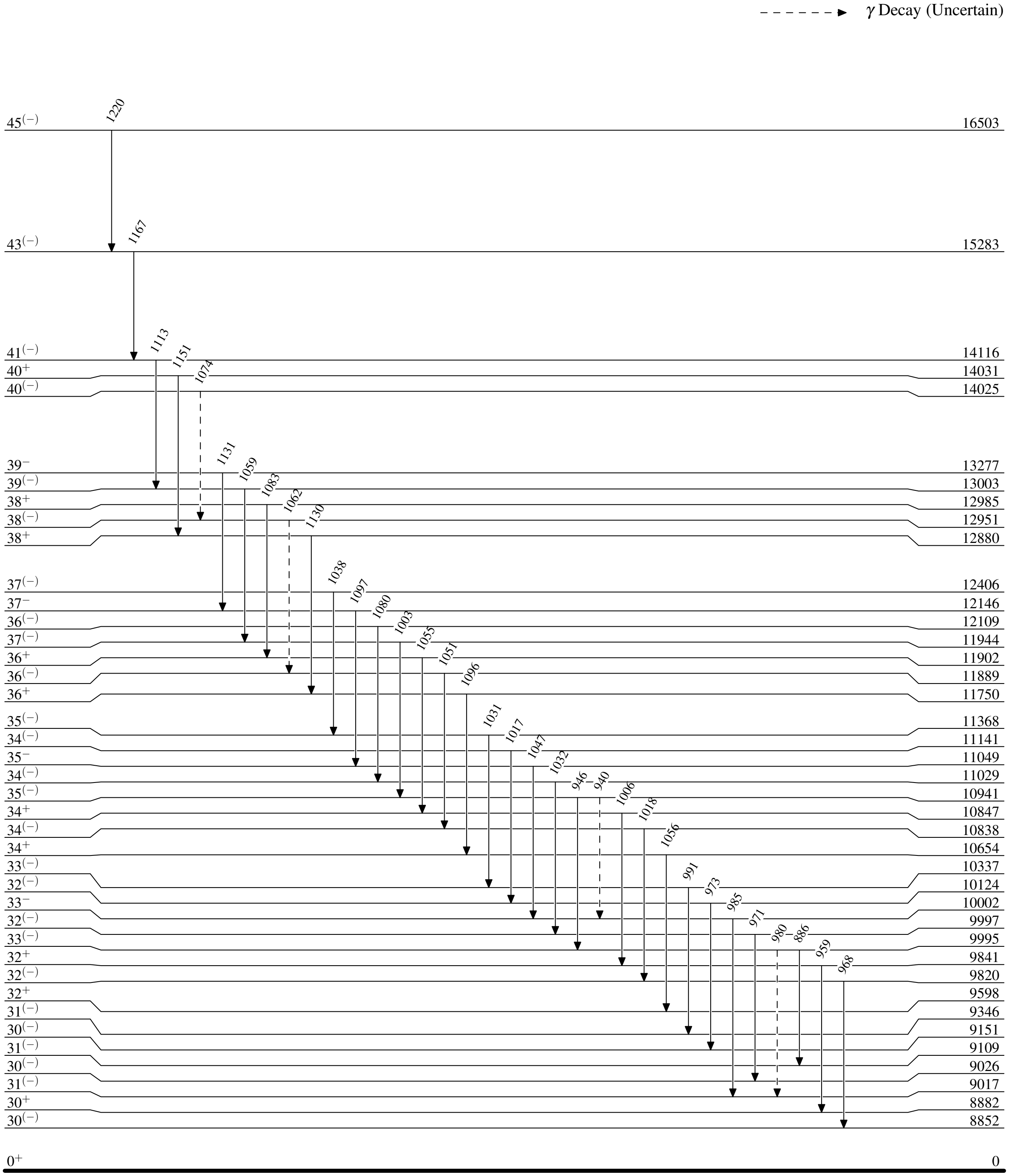
$^{170}_{72}Hf_{98}$

$^{124}Sn(^{50}Ti,4n\gamma)$:SD 2006Ne03,2002Ne20,2013Sm02

Level Scheme (continued)

Intensities: Relative I_γ

Legend

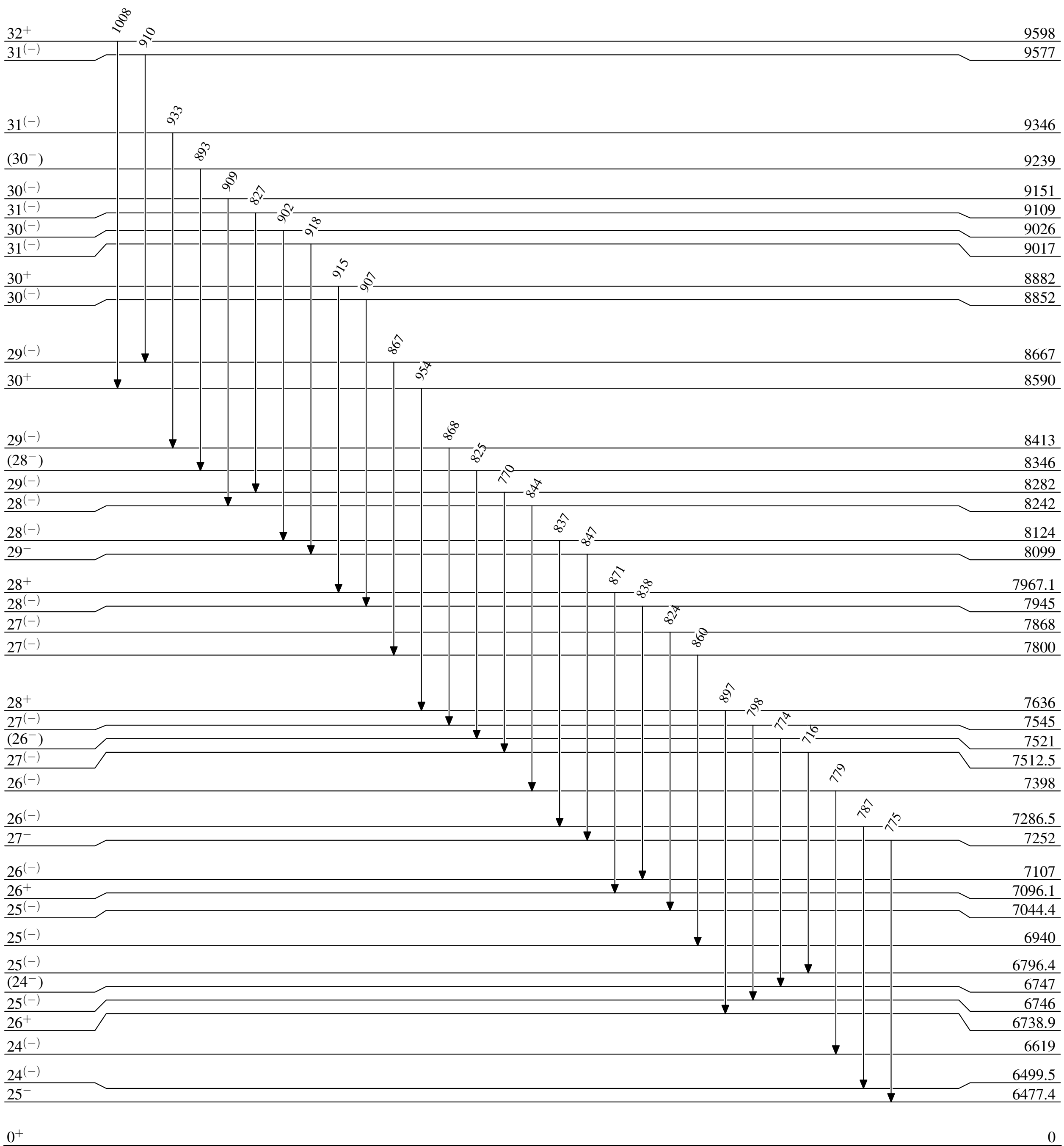


$^{170}_{72}Hf_{98}$

^{124}Sn(^{50}Ti,4nγ):SD 2006Ne03,2002Ne20,2013Sm02

Level Scheme (continued)

Intensities: Relative I_γ

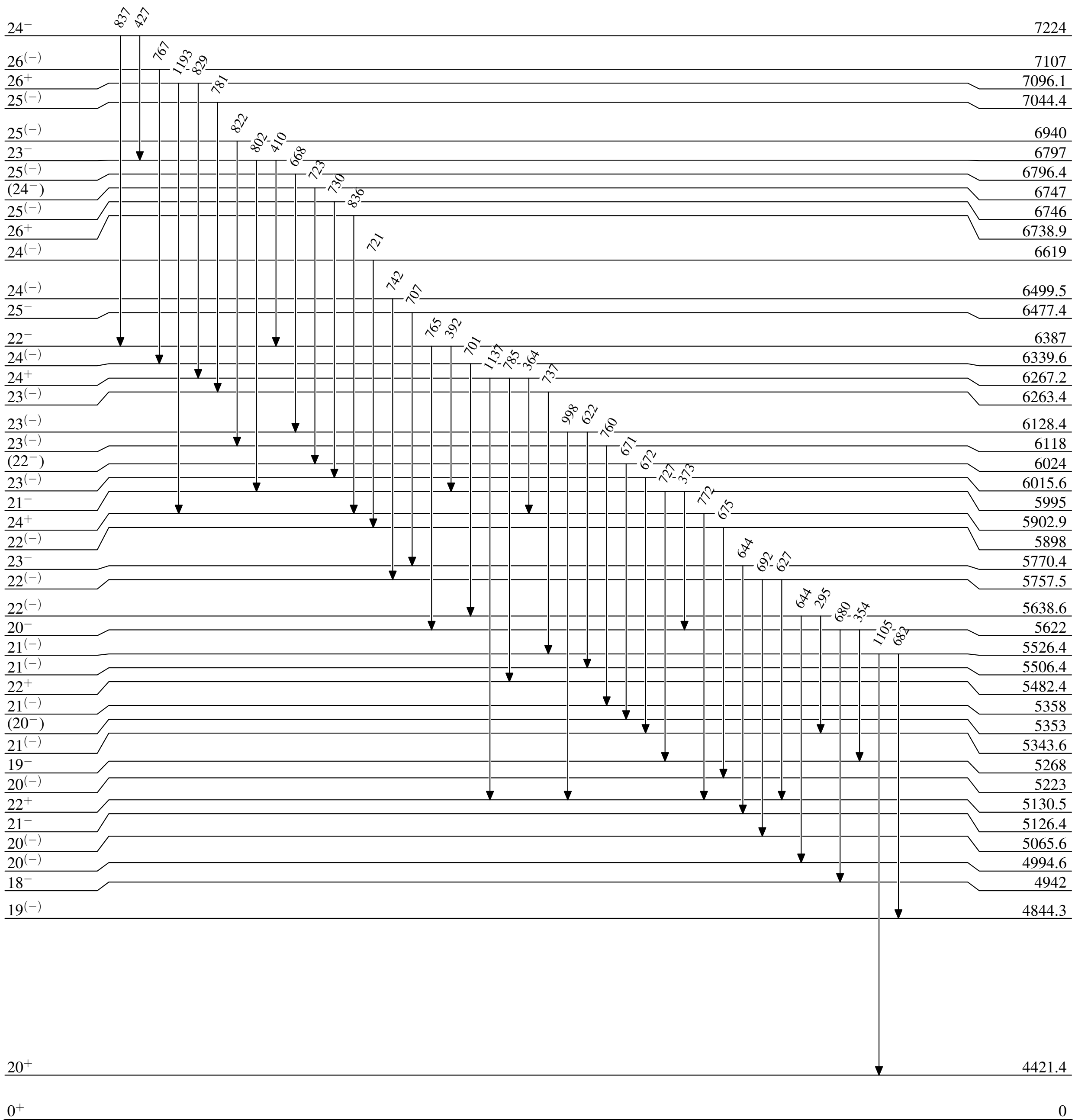


$^{170}_{72}Hf_{98}$

$^{124}Sn(^{50}Ti,4n\gamma)$:SD 2006Ne03,2002Ne20,2013Sm02

Level Scheme (continued)

Intensities: Relative I_γ

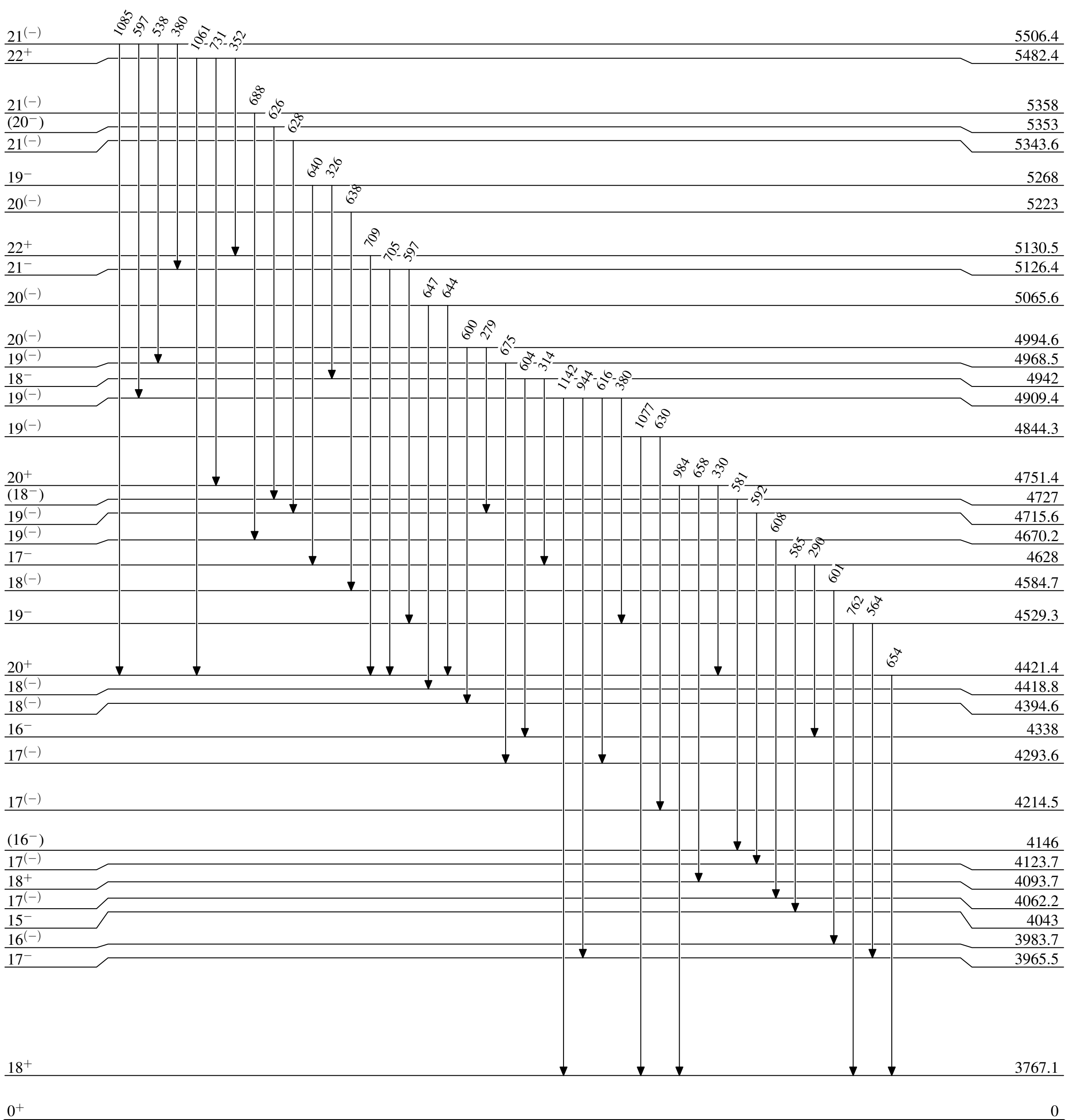


$^{170}_{72}Hf_{98}$

$^{124}Sn(^{50}Ti,4n\gamma)$:SD 2006Ne03,2002Ne20,2013Sm02

Level Scheme (continued)

Intensities: Relative I_γ

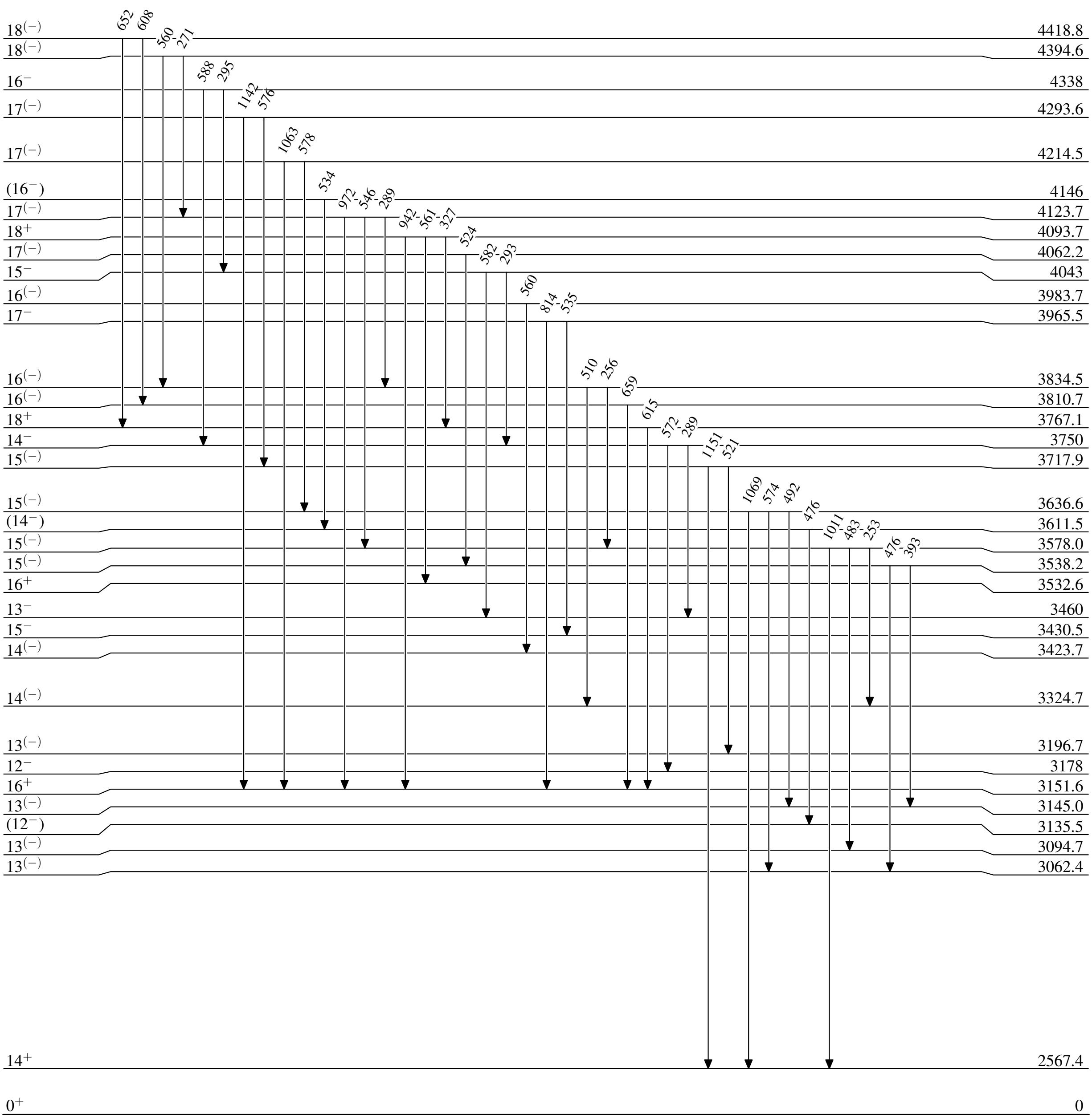


$^{170}_{72}Hf_{98}$

^{124}Sn(^{50}Ti,4nγ):SD 2006Ne03,2002Ne20,2013Sm02

Level Scheme (continued)

Intensities: Relative I_γ

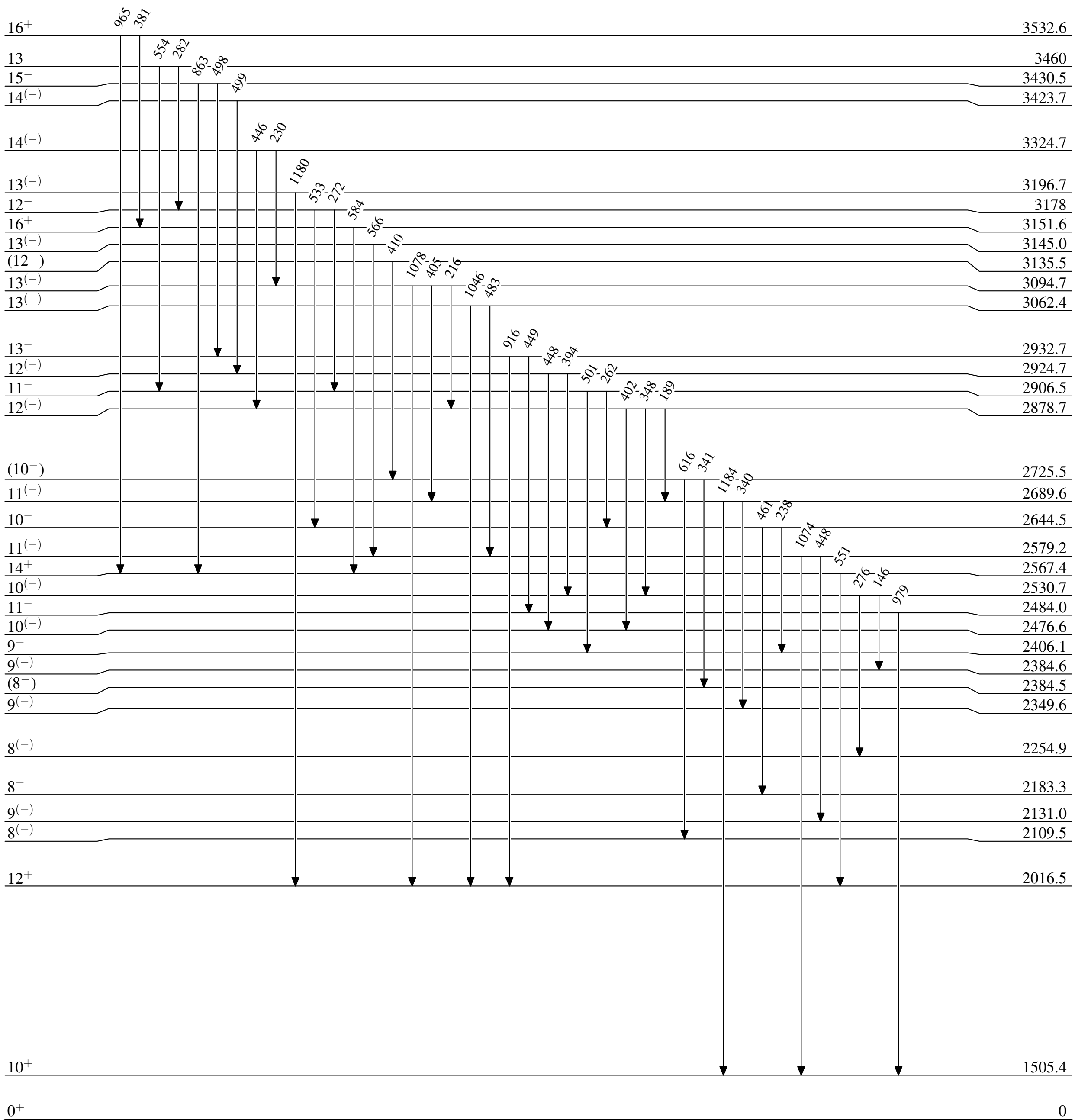


$^{170}_{72}Hf_{98}$

$^{124}Sn(^{50}Ti,4n\gamma)$:SD 2006Ne03,2002Ne20,2013Sm02

Level Scheme (continued)

Intensities: Relative I_γ

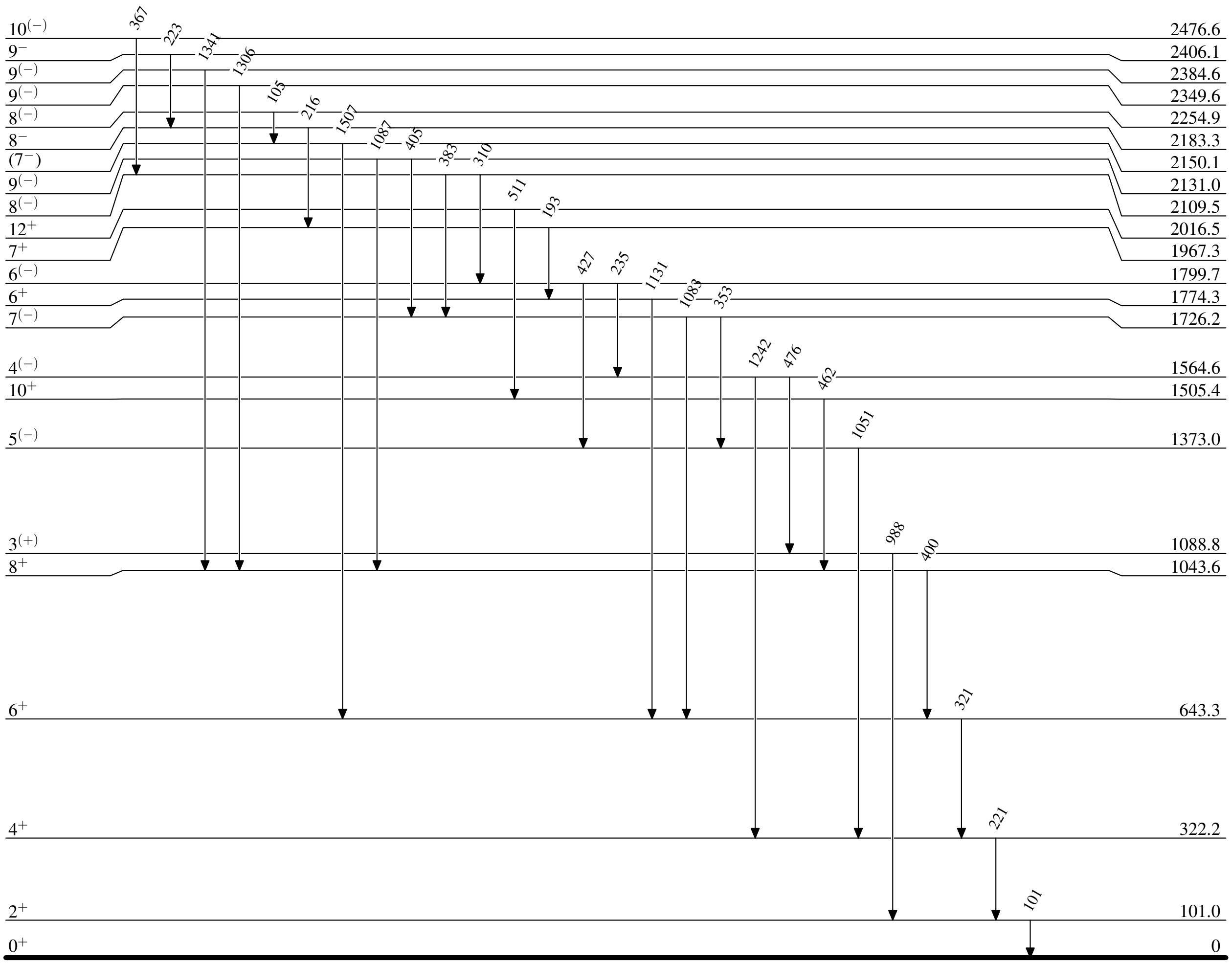


$^{170}_{72}Hf_{98}$

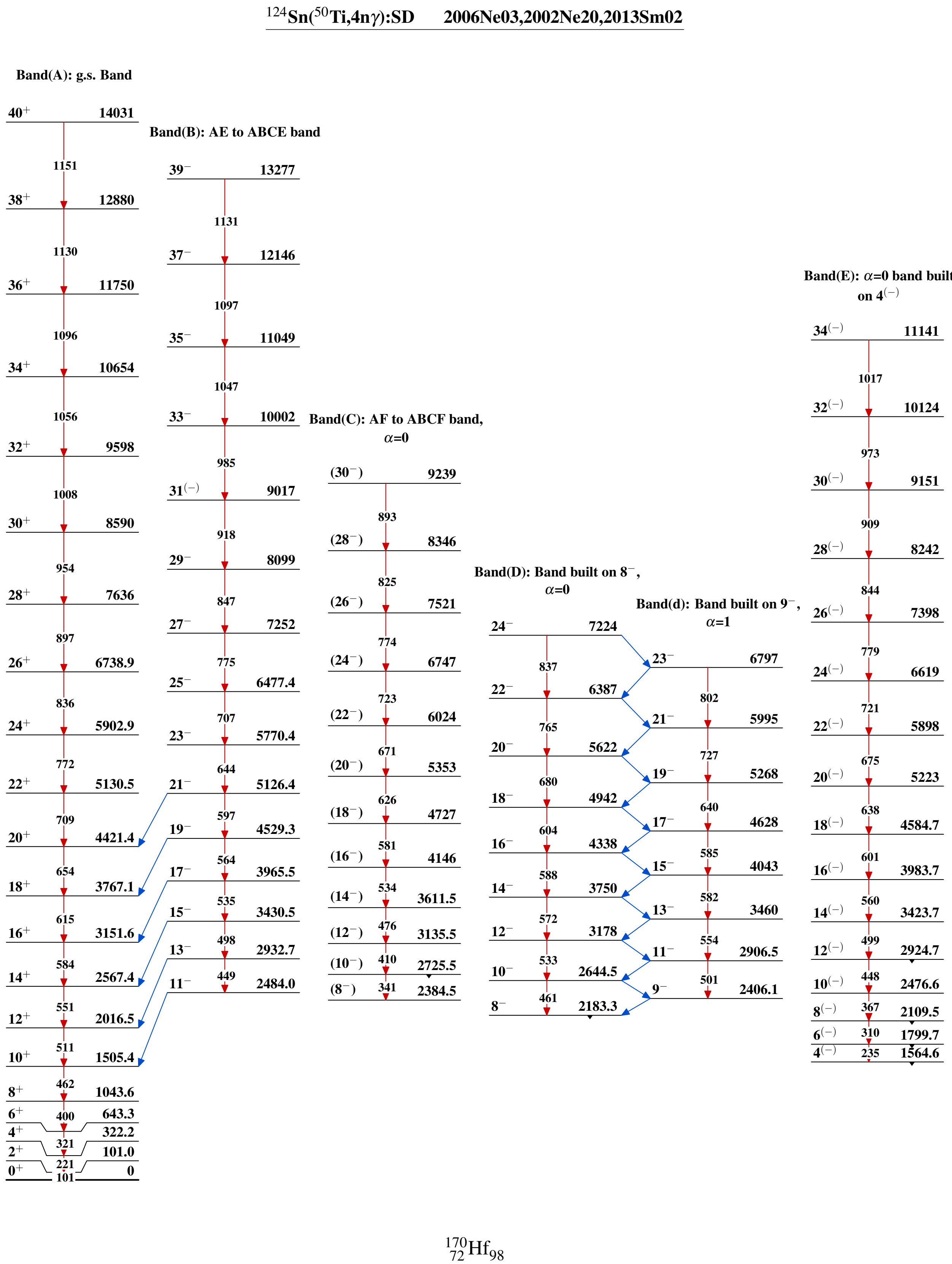
$^{124}Sn(^{50}Ti,4n\gamma)$:SD 2006Ne03,2002Ne20,2013Sm02

Level Scheme (continued)

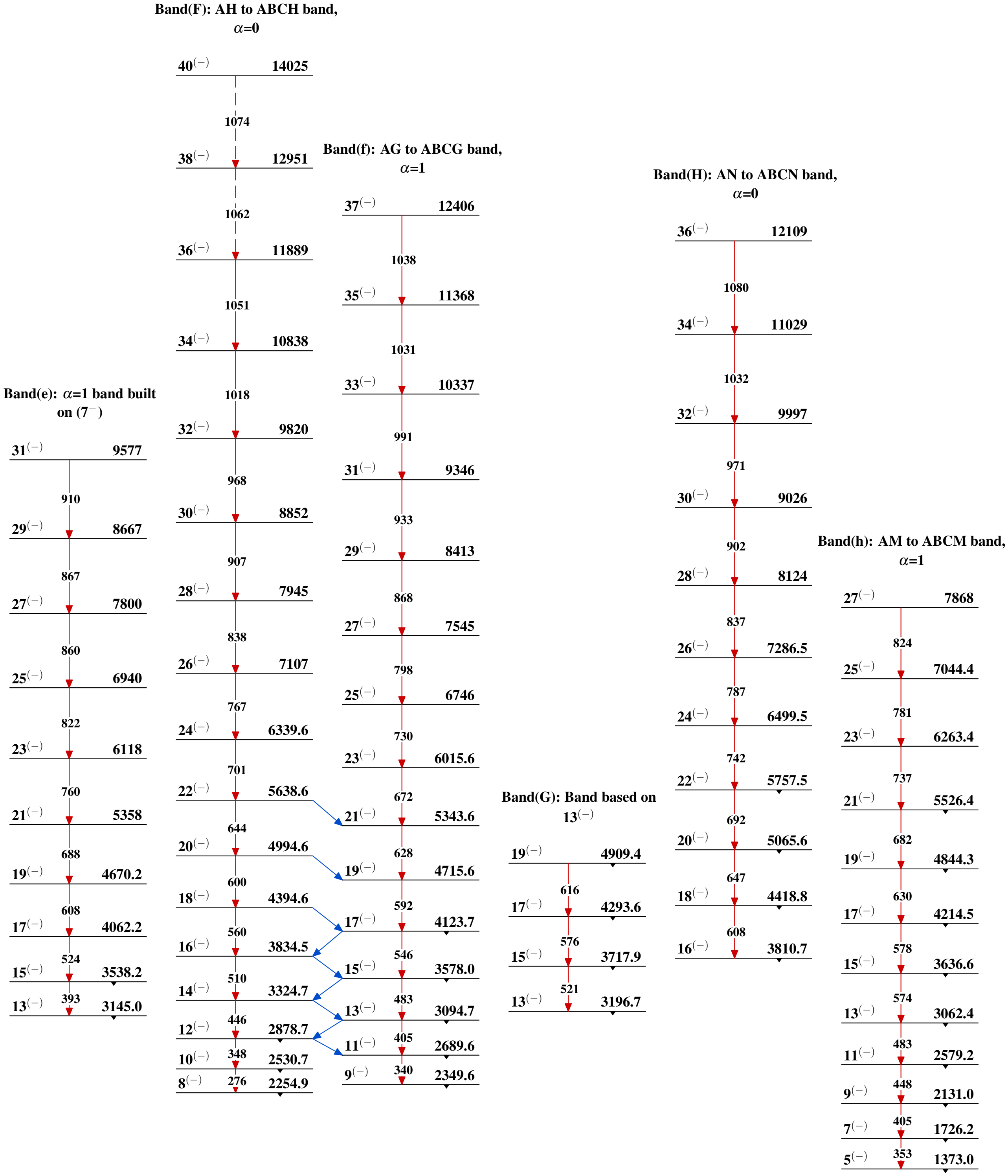
Intensities: Relative I_γ



$^{170}_{72}Hf_{98}$

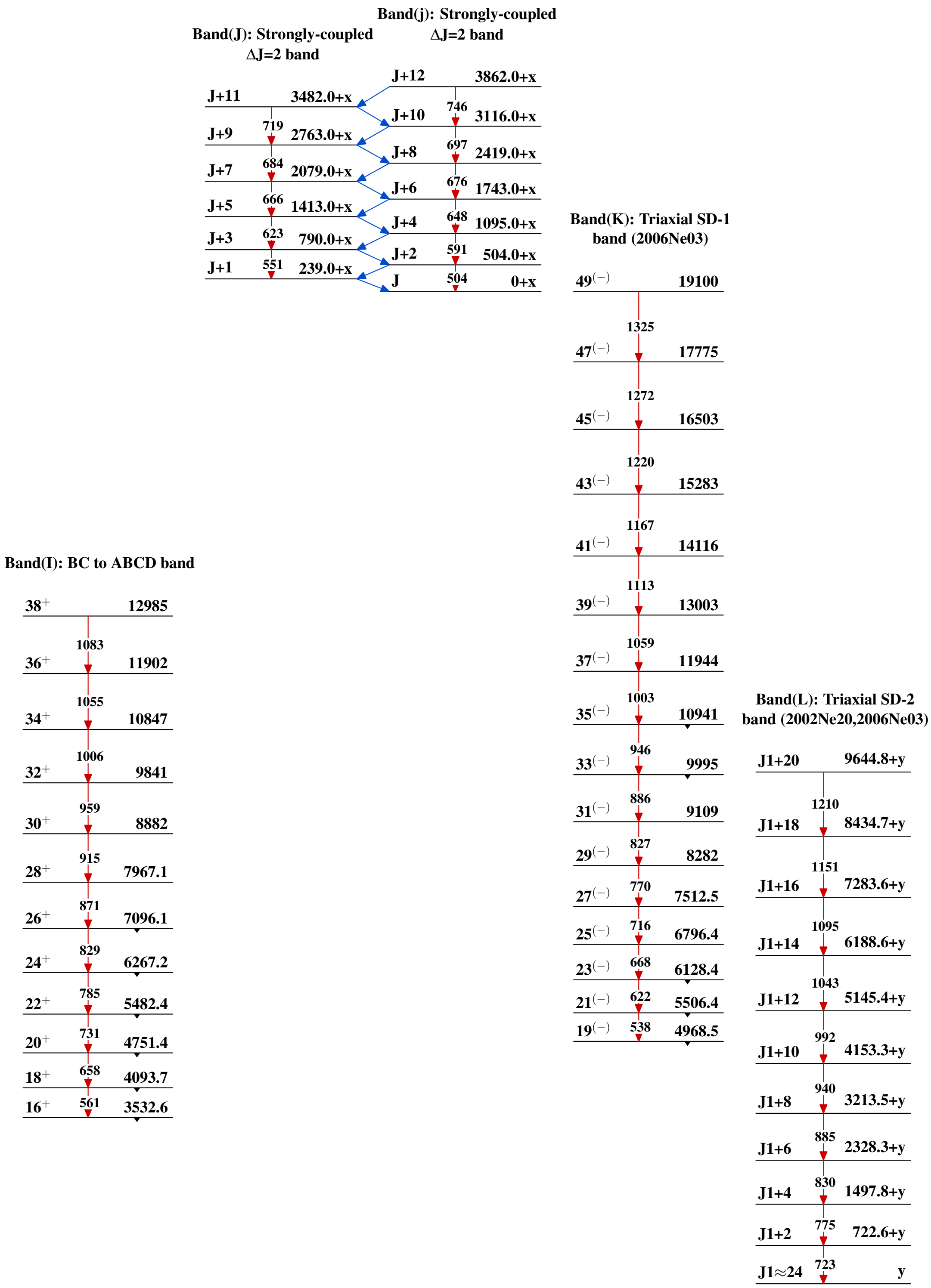

$^{124}Sn(^{50}Ti,4n\gamma)$:SD 2006Ne03,2002Ne20,2013Sm02
Band(A): g.s. Band
Band(B): AE to ABCE band
Band(C): AF to ABCF band, α=0
Band(D): Band built on 8⁻, α=0
Band(d): Band built on 9⁻, α=1
Band(E): α=0 band built on 4(−)
$^{170}_{72}Hf_{98}$

$^{124}Sn(^{50}Ti,4n\gamma)$:SD 2006Ne03,2002Ne20,2013Sm02 (continued)



$^{170}_{72}Hf_{98}$

$^{124}Sn(^{50}Ti,4n\gamma)$:SD 2006Ne03,2002Ne20,2013Sm02 (continued)



$^{170}_{72}Hf_{98}$