(HI,xnγ) 2019Sa61,2019Ma70,1987By04

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 176, 1 (2021)	1-May-2021

Includes the reactions:
^{48}Ti(^{116}Cd,4nγ), E(^{116}Cd)=495 MeV;
^{64}Ni(^{100}Mo,4nγ), E(^{100}Mo)=430 MeV;
^{116}Cd(^{48}Ti,4nγ), E(^{48}Ti)=205 MeV;
^{120}Sn(^{44}Ca,4nγ), E(^{44}Ca)=200 and 210 MeV;
^{124}Te(^{40}Ar,4nγ), E(^{40}Ar)=170-190 MeV;
^{144}Nd(^{20}Ne,4nγ), E(^{20}Ne)=108 MeV;
^{147}Sm(^{16}O,3nγ), E(^{16}O)=73 MeV and 80-84 MeV;
^{148}Sm(^{16}O,4nγ), E(^{16}O)=90 MeV;
^{152}Sm(α,2nγ), E(α)=25 MeV.

2019Ma70 was compiled for XUNDL database by E.A. McCutchan (NNDC,BNL).

2019Sa61 was compiled for XUNDL database by N. Nica (TAMU).

2010Ba02 was compiled for XUNDL database by B. Karamy and B. Singh (McMaster).

2019Sa61, 2018Sa07 (same experiment): ^{148}Sm(^{16}O,4nγ), 97% enriched $^{148}Sm_2O_3$ target, E=90 MeV; measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma\gamma$ using the Indian National Gamma Array (20 Compton suppressed HPGe clover detectors placed on 23°, 40°, 65°, 90°, 115°, 140°, and 157° detector rings relative to beam direction). Measured DCO, R(θ), IPDCO (integrated polarization directional correlation of oriented states) ratios. 2018Sa07 report the g.s. yrast band and non-yrast negative parity bands, while 2019Sa61 supersede 2018Sa07 (same experiment) reporting both negative and positive bands with DCO, R(θ), IPDCO ratio values for all transitions. Discussed the level scheme of 2010Ba02 and 2005Ba88 questioning over 70 transitions through $\gamma\gamma\gamma$ technique. Searched for tetrahedral symmetry but none of the bands observed satisfied the tetrahedral symmetry conditions.

2019Ma70, 2010Ba02, 2010Ba25 and 2005Ba88 (same group): ^{147}Sm(^{16}O,3nγ), E=73 MeV; using the AFRODITE detector array comprising of 8 HPGe clover detectors at iThemba Labs. Measured Eγ, Iγ, $\gamma\gamma$ and DCO ratios with values reported only by 2019Ma70. Discussion of observed structures in connection with the tetrahedral shapes. Negative-parity bands are shown by the last three references with most extended bands to highest populated states given by 2010Ba25 and 2010Ba02, while positive-parity bands are given by 2019Ma70 and 2005Ba88.

1980Ri08, 1983Ri10: ^{147}Sm(^{16}O,3n), E(^{16}O)=80-84 MeV; ^{144}Nd(^{20}Ne,4n), E(^{20}Ne)=108 MeV. In the ^{16}O reaction, the level and γ-ray properties were derived from measurements of both singles and multiplicity-gated coincidence spectra, angular distributions, γ-ray polarizations, and conversion-electron intensities. The ^{20}Ne-reaction data made it possible to extend the band structure observed in the ^{16}O reaction to higher spin states.

1987By04: ^{120}Sn(^{44}Ca,4n), E(^{44}Ca)=210 MeV. ^{120}Sn target consisted of five stacked foils, each of thickness 300 mg/cm^2. γ rays detected using the spectrometer system TESSA 2, consisting of six Compton-suppressed Ge detectors outside a 50-element BGO crystal ball. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$. From measured W(30°)/W(90°) ratios, stretched quadrupole transitions can be distinguished from stretched dipole ones. J^π assignments made on the basis of previous work, W(30°)/W(90°) ratios and systematics of band structure in neighboring nuclei. This work extends the previously available data on the positive-parity yrast levels and the two lowest negative-parity bands and suggests a somewhat different structure for these latter two.

See also: 1981Ri08, 1980Ri02, 1979Be02.

Lifetimes for a number of excited states have been measured using the Doppler-shift recoil-distance technique. Such data are reported by: 1988Fe01, who use the ^{116}Cd(^{48}Ti,4n), E(^{48}Ti)=205 MeV, and the ^{48}Ti(^{116}Cd,4n), E(^{116}Cd)=495 MeV, reactions (both yielding the same center-of-mass energy, namely 145 MeV); 1990Lu02, who use the ^{64}Ni(^{100}Mo,4n) reaction with E(^{100}Mo)=430 MeV; and 1976Bo27, who use the ^{124}Te(^{40}Ar,4n) reaction with E(^{40}Ar)=170-190 MeV. In addition, 1996Jo03 report values for the lifetimes of the J^π=22$^+$ through the 36$^+$ members of the yrast band. These were measured using Doppler-broadened line-shape techniques. These states were populated via the ^{120}Sn(^{44}Ca,4n) reaction, with E(^{44}Ca)=200 MeV. Both Pb and Au were used as target backings in these studies. For previous reports from these groups see, for example, 1985Fe02, 1982FeZZ, 1975BoZD.

1990Lu02 also report “average” g-factor values for two groups of states in the yrast band.

2019Sa61 used triple-coincidence data for level scheme analysis (double-coincidence data could not be used). When compared with 2010Ba02 or 2005Ba88 level schemes (obtained from double-coincidence data) many of the weak low-lying inter-band transitions from bands 2, 4, 5, 7, 8, 9 were not retrieved by 2019Sa61, as well as in-band transitions of band 9 and all transitions of bands 11 and 12. The comparison is even more difficult becasue of 2010Ba02 and 2005Ba88 that did not list any γ-ray relative intensity

(HI,xnγ) 2019Sa61,2019Ma70,1987By04 (continued)

information. Although questioned, all missing transitions and their corresponding levels were maintained by 2019Sa61 in their level scheme (Figs. 9 and 10). Indeed while triple-coincidence techinque is more selective it can lose weak transitions due to the lack of statistics. As only an inter-comparison of double-coincidence data of 2019Sa61 with 2010Ba02 and 2005Ba88 together with a thorough analysis of possible contaminants could reject such transitions, they are kept and listed as questionable by the evaluator as well. As most of these questioned transitions are in between existing levels they could possibly be revealed by more productive experiments. Finally 2019Ma70 bring new data and confirm the existence and placements of the low-lying inter-band transitions of bands 7, 8 and 9 of 2005Ba88, which indicates that those of 2010Ba02 should not be discarded before new measurements.

^{160}Yb Levels

E(level)[†]	J^π[‡]	$T_{1/2}$[#]	Comments
0.0[b]	0^+	4.8 min *2*	$T_{1/2}$: from adopted values.
243.19[b] *8*	2^+	121 ps *7*	J^π: E2 γ to 0^+ g.s. $T_{1/2}$: weighted average of 110 ps *6* (1988Fe01) and 126 ps *4* (1976Bo27).
638.69[b] *9*	4^+	8.5 ps *6*	J^π: E2 γ to 2^+. $T_{1/2}$: weighted average of 10.3 ps *7* (1988Fe01), 8.3 ps *5* (1990Lu02), and 8.0 ps *4* (1976Bo27).
820.44[h] *8*	2^+		J^π: E2 γ to 0^+ g.s.
1085?[j]	$(0)^+$		Level suggested by 2005Ba88 and 2019Ma70 but not confirmed by a different group.
1112.80[i] *9*	3^+		J^π: M1+E2 γ to 2^+.
1147.36[b] *11*	6^+	1.9 ps *2*	$T_{1/2}$: from 1976Bo27. 1988Fe01 report $T_{1/2}$<1.1 ps and 1990Lu02 report $T_{1/2}$=0.9 ps *5*, an average of $T_{1/2}$-values for the 6^+ and 8^+ states.
1255.67[h] *9*	(4^+)		J^π: 4^+ based on Q,E2, 435γ to 2^+ (2019Ma70), contradicted by 3^- based on E1, 617γ to 4^+ (2019Sa61). Moreover according to 1984Au13 both 435γ and 617γ are E1 based on α(K)exp (in the ε decay dataset) which makes 3^- the best adopted value based on strong arguments. However if 3^- this would be an odd-spin negative parity band with M2, 318γ and 366γ from band 8 and E3, 566γ from band 10, which is unlikely, which rather qualifies this level as the 4^+ and member of γ-vibrational band as placed in this dataset by 2005Ba88 and maintained by 2019Ma70.
1292.05[j] *12*	(2^+)		J^π: from 2019Ma70 from mult with no given evidence.
1358.2?[af] *7*	(3^-)		J^π: (3^-) from DCO ratio of 1115γ to 2^+ (2010Ba02), which is inconsistent with 2^+ from E2, 719.9γ to 4^+ in ε decay and was preferred by evaluator in Adopted Levels table. The unobserved 210γ from (5^-), 1568 makes more 2^+ more likely as well. If so this level is not member of the octupole α=1 band, reason for which is questioned here.
1524?[e]	(3^-)		Level drawn in continuation of band AE, π=−, α=1 with no J^π assignment in Fig. 2 (Level Scheme of ^{160}Yb) of 2005Ba88, but no longer reproduced by 2010Ba02 and 2010Ba25.
1567.5[d] *8*	$(4)^-$		J^π: based on γ-feeding of this state, it is probably a member of the signature-zero, negative-parity side band. If so, J is most likely 4.
1567.86[f] *16*	(5^-)		A same energy, $(4)^-$ level decayed by a same energy transition (929.6γ, compare with 929.4γ here) was placed by 1987By04, 1983Ri10, and 1980Ri08 in another band.
1574.10[i] *10*	5^+		J^π: E2 γ to 3^+.
1591.83[j] *11*	4^+		J^π: E2 γ from 6^+.
1629.0?[al]			
1694.73[g] *18*	(4^-)		
1737.02[b] *12*	8^+	1.0 ps *2*	$T_{1/2}$: weighted average of 1.5 ps *5* (1988Fe01) and 0.89 ps *20* (1976Bo27). 1990Lu02 report $T_{1/2}$=0.9 ps *5*, an average of $T_{1/2}$-values for the 6^+ and 8^+ states.
1743.57[h] *11*	(6^+)		J^π: E2 γ to (4^+).
1871?[e]	(5^-)		Level drawn in continuation of band AE, π=−, α=1 with no J^π assignment in Fig. 2 (Level Scheme of ^{160}Yb) of 2005Ba88, but not reproduced by 2010Ba02 and 2010Ba25.
1927.21[f] *13*	7^-		J^π: E1 780γ to 6^+ state.
1952.0?[al]			
1957.43[j] *11*	6^+		J^π: E2 γ to 4^+, 638.
2050.47[g] *16*	(6^-)		This 2050, (6^-) level with its decaying 483γ and 903γ placed in this band by 2010Ba02 and

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(HI,xnγ) 2019Sa61,2019Ma70,1987By04 (continued)

^{160}Yb Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	Comments
			2010Ba25 as well as by 2019Sa61 is the same as 2051, (6)$^-$ level with its decaying 484 and 903.6 placed in a different band by 1987By04, 1983Ri10, and 1980Ri08.
2050.78[d] *24*	(6)$^-$		See comment at the nearby level.
2108.71[i] *11*	7$^+$		J^{π}: E2 γ to 5$^+$.
2272.0?[ae] *6*	7$^-$		
2274.49[h] *12*	(8$^+$)		J^{π}: E2 γ to (6$^+$).
2362.54[d] *14*	8$^-$		
2364.37[j] *12*	8$^+$		J^{π}: E2 γ to 6$^+$.
2372.85[f] *14*	9$^-$		
2374.52[b] *17*	10$^+$	1.1 ps *3*	$T_{1/2}$: weighted average of 1.0 ps *6* (1988Fe01), 1.3 ps *3* (1990Lu02), and 0.60 ps *35* (1976Bo27).
2415.0?[al]			
2480.77[e] *14*	9$^-$		J^{π}: π=− from E1 multipolarity of 744γ to 8$^+$ state.
2527.64[g] *19*	(8$^-$)		
2578.80[d] *15*	10$^-$	90[@] ps *28*	
2649.3?[ac] *9*	(8$^-$)		
2701.04[i] *14*	9$^+$		
2704.0[n] *13*	(8$^-$,9$^+$)		
2718.4?[am] *6*	(9$^-$)		
2764.20[e] *15*	11$^-$	46[@] ps *4*	
2790.08[h] *12*	(10$^+$)		J^{π}: E2 γ to (8$^+$).
2840.65[j] *13*	(10$^+$)		
2878.25[f] *16*	11$^-$		
2898.49[c] *17*	(10$^-$)		
2943?[al]			
2961.00[b] *19*	12$^+$	1.0[@] ps *4*	$T_{1/2}$: 1990Lu02 report $T_{1/2}$≤0.8 ps.
2977.87[d] *16*	12$^-$		
3009.0[g] *3*	(10$^-$)		
3024.8[n] *9*	(10$^-$,11$^+$)		
3127.5?[am] *8*	(11$^-$)		
3137.74[k] *19*	12$^+$	<6[@] ps	
3195.92[e] *17*	13$^-$	<6[@] ps	
3318.97[h] *14*	(12$^+$)		J^{π}: E2 γ to (10$^+$).
3329.87[c] *17*	(12$^-$)		
3330.75[i] *17*	11$^+$		J^{π}: E2 γ to 9$^+$.
3365.11[b] *21*	14$^+$	7.7 ps *8*	$T_{1/2}$: weighted average of 6.6 ps *6* (1988Fe01) and 8.3 ps *4* (1990Lu02).
3423.1[f] *3*	13$^-$	<3[@] ps	
3457.5[n] *9*	(12$^-$,13$^+$)		
3518.66[d] *18*	14$^-$	3.8[@] ps *12*	
3545.0?[ag] *11*	(12$^-$)		
3682.7?[am] *8*	(13$^-$)		
3745.97[k] *20*	14$^+$		
3757.52[e] *19*	15$^-$	<3[@] ps	
3849.21[b] *23*	16$^+$	1.6 ps *3*	$T_{1/2}$: weighted average of 1.6 ps *3* (1988Fe01) and 1.5 ps *7* (1990Lu02). Note that the transition quadrupole moment derived from this $T_{1/2}$ value is significantly larger than those of the other members of this band.
3869.76[h] *17*	(14$^+$)		
3896.9[c] *3*	(14$^-$)		

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(HI,xnγ) 2019Sa61,2019Ma70,1987By04 (continued)

^{160}Yb Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	Comments
4015.87[i] *21*	(13+)		
4025.1[n] *13*	(14−,15+)		
4029.0[f] *4*	15(−)		
4172.74[d] *22*	16−	1.4[@] ps *7*	
4310.7?[am] *10*	(15−)		
4375.97[k] *22*	16+		
4427.61[b] *25*	18+	2.1 ps *3*	$T_{1/2}$: weighted average of 2.2 ps *4* (1988Fe01) and 1.6 ps *7* (1990Lu02).
4428.93[e] *25*	17−	1.5[@] ps *6*	
4475.8[h] *3*	(16+)		Jπ: from Fig. 9 (level scheme) (2019Sa61).
4555.9[c] *4*	(16−)		
4684.1[n] *17*	(16−,17+)		
4702.5[f] *4*	17(−)	<7[@] ps	
4714.3 *3*	(18+)		
4911.9[d] *3*	18−	<5[@] ps	
4984.7 *3*	(17+)		
4990.3?[am] *16*	(17−)		
5036.0[k] *3*	(18+)		
5091.3[b] *3*	20+	1.1[@] ps *3*	
5176.9[e] *4*	(19)−	1.3[@] ps *8*	
5203.9[c] *4*	(18−)		
5332.0[n] *20*	(18−,19+)		
5368.3 *11*			E(level): from 1983Ri10.
5406.6[f] *5*	(19)−		
5692.9[d] *4*	20−		
5827.7[b] *3*	22+	0.53[&] ps *9*	$T_{1/2}$: 1988Fe01 report $T_{1/2}$=1.0 ps *3*.
5948.0[e] *4*	(21)−	1.7[@] ps *6*	
6124.2[f] *5*	(21)−		
6380.9[d] *4*	22−		
6623.3[b] *4*	24+	0.15[&] ps *2*	$T_{1/2}$: 1988Fe01 report $T_{1/2}$<3 ps.
6694.3[e] *5*	(23)−	<2[@] ps	
7092.6[d] *5*	24−		
7459.0[b] *4*	26+	0.18[&] ps *+3−4*	
7459.3[e] *5*	(25)−		
7870.6[d] *5*	26−		
8272.3[e] *11*	(27)−		
8289.7[b] *5*	28+	0.19[&] ps *3*	
8708.6[d] *6*	28−		
9126.7[b] *5*	30+	0.19[&] ps *+3−5*	
9132.3[e] *15*	(29)−		
9555.6[d] *6*	(30)−		
10003.7[b] *12*	32+	0.19[&] ps *+6−3*	
10010.3[e] *18*	(31)−		
10408.7[d] *12*	(32)−		
10887.3[e] *21*	(33)−		
10957.7[b] *15*	34+	0.18[&] ps *3*	
11293.7[d] *16*	(34)−		
11790.4[e] *23*	(35)−		

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(HI,xnγ) 2019Sa61,2019Ma70,1987By04 (continued)

^{160}Yb Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]
11964.7[b] *18*	36+	0.26[&] ps *3*	13042.7[b] *21*	38+	14200.7[b] *23*	40+
12228.7[d] *19*	(36)−		13228.7[d] *21*	(38)−	14290?[d]	(40−)
12740.4[e] *25*	(37)−		13740[e] *3*	(39)−	15403?[d]	(42−)

[†] From least-squares fit to the Eγ′s, assuming 1 keV uncertainty for each γ ray when uncertainty not given.
[‡] For the three bands populated up to highest spin values (about 40): from 1987By04; for the other bands the values from 2019Sa61 were generally preferred, except for bands 8 and 9 adopted from 2019Ma70. To avoid conflict some values were considered tentatively, or some values from Adopted Levels were preferred. Where needed explicit arguments are given.
[#] In the original papers, the authors report level lifetimes rather than half-lives. The weighted averages were computed from these lifetime values and the results then converted to produce the half-life values listed here.
[@] From 1988Fe01, except where noted otherwise.
[&] Values reported by 1996Jo03, from Doppler broadened line shapes.
[a] Level not confirmed by 2019Sa61.
[b] Band(A): Band 1 g.s. band.
[c] Band(b): Band 2 AG, π=−, α=0.
[d] Band(c): Band 3 AF, π=−, α=0. Negative-parity, signature-0, side band. Probable configuration=(ν 3/2[651])(ν 3/2[532] and ν 3/2[521]).
[e] Band(C): Band 4 AE, π=−, α=1. Negative-parity, signature-1, side band. Probable configuration=(ν 3/2[651])(ν 3/2[532] and ν 3/2[521]).
[f] Band(D): Band 5 octupole band, α=1. According to 2019Sa61 Band 5 is compatible with a Y30-octupole pear-shape one-phonon vibration band (2019Sa61). Probable configuration=(ν 3/2[651])(ν 3/2[532] and ν 3/2[521]).
[g] Band(d): Band 6 octupole band, α=0. Tetrahedral nature of this band proposed earlier in the literature is not supported in 2010Ba02 based on nonzero values of absolute and relative quadrupole moments. According to 2019Sa61 this band is compatible with a $K^{\pi}=2^{-}$, Y32-triplanar-octupole or tetrahedral-vibration band.
[h] Band(e): Band 7. Even-spin γ-vibrational band based on 2^{+}.
[i] Band(f): Band 8. Odd-spin γ-vibrational band based on 3^{+}.
[j] Band(E): Band 9. Tentative β-vibrational band.
[k] Band(G): Band 10. Aligned positive-parity (or S) band.
[l] Band(F): Band 11. Side band: unassigned J^{π} values.
[m] Band(B): Band 12 AH, π=−, α=1.
[n] Band(H): Band 13. Side band: parity and signature uncertain. Except for the first transitions, this band (with even J values and π=−) is identical with the AG, π=−, α=0 band (each band with different excitation energies).

γ(^{160}Yb)

2019Sa61, DCO (angular correlations), R(θ) (angular distributions) and IPDCO ratios (polarization) measured as follows:

DCO ratios from 157° and 90° detector rings with typical values 0.44 *4* for known dipole 779.7γ and 1.04 *3* for known quadrupole 395.6γ, in gated spectrum on pure quadrupole transition. With gated spectrum on pure dipole transition, typical value is 2.00 *8* for known quadrupole 243.5γ. Gate′s nature is given in parentheses with DCO in table comments.

R(θ) ratios obtained from 157° and 90° detector rings gated over all angles with typical values 0.8-1.2 for dipole and 2.18-2.57 for quadrupole transitions.

Linear polarization IPDCO ratios obtained from the numbers of Compton-scattered γ rays in the planes perpendicular and parallel to the reaction plane (including the a(E_{γ}) asymmetry factor). Typical values: positive for electric and negative for magnetic characters, respectively.

2019Ma70: R(DCO) were measured using detectors at angles of 135° and 90° with one transition chosen to be of known stretched E2 character and expected ratios of 0.6 and 1.0 for stretched pure dipole or quadrupole character, respectively. The polarization anisotropy is positive for a pure stretched electric transition and negative for a pure stretched magnetic transition.

(HI,xnγ) 2019Sa61,2019Ma70,1987By04 (continued)

γ(^{160}Yb) (continued)

Unplaced gammas are from 2019Sa61.

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	Comments
97.9 *2*	0.4 *2*	2578.80	10^-	2480.77	9^-		
106.2 *2*	0.2 *1*	2480.77	9^-	2374.52	10^+		
179[ab]		2898.49	(10^-)	2718.4?	(9^-)		
185.5 *2*	0.2 *1*	2764.20	11^-	2578.80	10^-		
205.8 *2*	1.2 *4*	2578.80	10^-	2372.85	9^-		
209[ab]		2480.77	9^-	2272.0?	7^-		
210.5[ab]		1567.86	(5^-)	1358.2?	(3^-)		E_γ: this transition is expected but unobserved by 2010Ba02 and remains unobserved by 2019Sa61 as well.
213.6 *2*	0.6 *3*	2977.87	12^-	2764.20	11^-		
216.4 *1*	9.2 *9*	2578.80	10^-	2362.54	8^-	E2	DCO(Q)=1.09 *8*, IPDCO=+0.19 *17*, R(θ)=2.31 *8* (2019Sa61).
243.2 *1*	100	243.19	2^+	0.0	0^+	E2	DCO(D)=2.00 *8*, IPDCO=+0.19 *4*, R(θ)=2.51 *6* (2019Sa61).
249[ab]		3127.5?	(11^-)	2878.25	11^-		
250[ab]		2898.49	(10^-)	2649.3?	(8^-)		
255.0 *2*	0.8 *4*	2362.54	8^-	2108.71	7^+	E1	DCO(Q)=0.53 *8*, R(θ)=1.23 *18* (2019Sa61).
259[ab]		3682.7?	(13^-)	3423.1	13^-		
283.4 *1*	11.8 *12*	2764.20	11^-	2480.77	9^-	E2	DCO(Q)=1.03 *5*, IPDCO=+0.22 *8*, R(θ)=2.42 *9* (2019Sa61).
286[ab]		2649.3?	(8^-)	2362.54	8^-		
292.35[@] *11*		1112.80	3^+	820.44	2^+	M1+E2[&]	R(DCO)=0.68 *8*, A_p=−0.07 *32*.
299.33[@] *21*		1591.83	4^+	1292.05	(2^+)		Mult.: E2 with no given evidence (2019Ma70).
300[ab]		2878.25	11^-	2578.80	10^-		
311.8 *2*	2.7 *8*	2362.54	8^-	2050.78	$(6)^-$	E2	DCO(Q)=0.84 *10*, IPDCO=+0.05 *9*, R(θ)=2.65 *12* (2019Sa61).
318[ab]		3195.92	13^-	2878.25	11^-		
318.05[@] *11*		1574.10	5^+	1255.67	(4^+)		Mult.: M1+E2 with no given evidence (2019Ma70).
319.7 *1*	0.5 *3*	2898.49	(10^-)	2578.80	10^-		
320.8	1.0	3024.8	$(10^-,11^+)$	2704.0	$(8^-,9^+)$		
322.7 *2*	0.5 *3*	3518.66	14^-	3195.92	13^-		
325[ab]		1952.0?		1629.0?			
334[ab]		3757.52	15^-	3423.1	13^-		
337[ab]		1694.73	(4^-)	1358.2?	(3^-)		
344[ab]		2272.0?	7^-	1927.21	7^-		
346[b]		1871?	(5^-)	1524?	(3^-)		
346[ab]		2718.4?	(9^-)	2372.85	9^-		
352.0 *2*	0.3 *2*	3329.87	(12^-)	2977.87	12^-		
355.9 *2*	0.6 *3*	2050.47	(6^-)	1694.73	(4^-)		
359.5 *2*	0.4 *2*	1927.21	7^-	1567.86	(5^-)		
365.55[@] *12*		2108.71	7^+	1743.57	(6^+)		Mult.: M1+E2 with no given evidence (2019Ma70).
365.60[@] *11*		1957.43	6^+	1591.83	4^+	E2[&]	R(DCO)=1.10 *18*.

Continued on next page (footnotes at end of table)

(HI,xnγ) 2019Sa61,2019Ma70,1987By04 (continued)

γ(^{160}Yb) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ	Comments
371[ab]		1629.0?		1255.67	(4+)			
371[ab]		2898.49	(10−)	2527.64	(8−)			
[x]376								
377[ab]		2649.3?	(8−)	2272.0?	7−			
378[ab]		3896.9	(14−)	3518.66	14−			
389.6 *2*	2.2 *7*	2764.20	11−	2374.52	10+			
391.3 *2*	4.4 *13*	2764.20	11−	2372.85	9−			
395.5 *1*	91.7 *28*	638.69	4+	243.19	2+	E2		E_γ: mean value of 395.6 *1* (2019Sa61) and 395.39 *10* (2019Ma70). DCO(Q)=1.04 *3*, IPDCO=+0.10 *3*, R(θ)=2.45 *6* (2019Sa61).
398[ab]		2878.25	11−	2480.77	9−			
399.1 *1*	12.7 *13*	2977.87	12−	2578.80	10−	E2		DCO(Q)=0.93 *7*, IPDCO=+0.06 *7*, R(θ)=2.46 *5* (2019Sa61).
404.11 *9*	33.3 *10*	3365.11	14+	2961.00	12+	E2		E_γ: unweighted average of 404.2 *1* (2019Sa61) and 404.02 *10* (2019Ma70). DCO(Q)=1.04 *3*, IPDCO=+0.08 *4*, R(θ)=2.51 *12* (2019Sa61).
406.81[@] *10*		2364.37	8+	1957.43	6+	(E2)[&]		R(DCO)=1.20 *11*.
408[ab]		3127.5?	(11−)	2718.4?	(9−)			
415.2 *2*	0.10 *5*	4172.74	16−	3757.52	15−			
418[ab]		2898.49	(10−)	2480.77	9−			
425.55[@] *10*		2790.08	(10+)	2364.37	8+			R(DCO)=0.80 *9*. Mult.: Q,E2 adopted by 2019Ma70 based on DCO which does not exclude D(+Q).
427.08[@] *11*		1574.10	5+	1147.36	6+			R(DCO)=0.98 *10* (2019Ma70). Mult.: M1+E2 adopted by 2019Ma70 based on DCO which however better fits Q,E2.
431.4 *1*	0.2 *1*	3329.87	(12−)	2898.49	(10−)			
431.7 *1*	10.6 *11*	3195.92	13−	2764.20	11−	E2		DCO(Q)=1.00 *7*, IPDCO=+0.09 *6*, R(θ)=2.24 *13* (2019Sa61).
433	1.5	3457.5	(12−,13+)	3024.8	(10−,11+)			
435.0 *2*	3.0 *9*	2362.54	8−	1927.21	7−	E2+M1	≈5	DCO(Q)=0.49 *7*, IPDCO=+0.11 *9*, R(θ)=1.20 *5* (2019Sa61). δ: from measured quadrupole content of ≈96% (1980Ri02).
435.15[@] *10*		1255.67	(4+)	820.44	2+	(E2)		R(DCO)=1.02 *9* (2019Ma70). Mult.: Q,E2 based on DCO (2019Ma70) contradicts E1 based on α(K)exp (1984Au13).
445.6 *2*	2.9 *6*	2372.85	9−	1927.21	7−	E2		DCO(Q)=1.03 *16*, IPDCO=+0.19 *20*, R(θ)=2.74 *21* (2019Sa61).
451[ab]		3329.87	(12−)	2878.25	11−			
461.33[@] *10*	0.8 *4*	1574.10	5+	1112.80	3+	E2[&]		R(DCO)=1.02 *12*, A_p=0.58 *14* (2019Ma70).
462[ab]		3423.1	13−	2961.00	12+			
463[ab]		2415.0?		1952.0?				
474.15[@] *11*		1112.80	3+	638.69	4+	M1+E2[&]		R(DCO)=0.72 *7*.
476.22 *11*		2840.65	(10+)	2364.37	8+			Mult.: E2 with no given evidence (2019Ma70).
477.2 *2*	1.5 *5*	2527.64	(8−)	2050.47	(6−)			
478.37[@] *10*		3318.97	(12+)	2840.65	(10+)	[&]		R(DCO)=0.68 *69*.

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(HI,xnγ) 2019Sa61,2019Ma70,1987By04 (continued)

γ(^{160}Yb) (continued)

Eγ[†]	Iγ[‡]	Ei(level)	J^π_i	Ef	J^π_f	Mult.[#]	Comments
481.4 2	2.5 8	3009.0	(10⁻)	2527.64	(8⁻)		
482.7 2	0.7 4	2050.47	(6⁻)	1567.86	(5⁻)		483γ and 903γ decaying from 2050, (6⁻) level are the same as 484γ and 903.6γ and decaying from 2051, (6)⁻ level but placed in different bands by different autors (see comments on respective levels).
483.0 2	<0.1	4911.9	18⁻	4428.93	17⁻		
484	1.1	2050.78	(6)⁻	1567.5	(4)⁻		See comment at 483γ.
484.1 1	21.9 20	3849.21	16⁺	3365.11	14⁺	E2	DCO(Q)=0.94 5, IPDCO=+0.20 7, R(θ)=2.14 5 (2019Sa61).
488.04[@] 10	1.9 6	1743.57	(6⁺)	1255.67	(4⁺)	E2[&]	R(DCO)=0.99 9 (2019Ma70).
496.3	0.7	3457.5	(12⁻,13⁺)	2961.00	12⁺		
503.7 2	1.4 4	2878.25	11⁻	2374.52	10⁺		
505.4 1	5.3 10	2878.25	11⁻	2372.85	9⁻	E2	DCO(D)=1.33 38 (2019Sa61).
508.96 23	87.6 26	1147.36	6⁺	638.69	4⁺	E2	Eγ: unweighted average of 509.2 1 (2019Sa61) and 508.73 10 (2019Ma70). DCO(Q)=0.89 6, IPDCO=+0.09 3 (2019Sa61).
514[ab]		1629.0?		1112.80	3⁺		
515.63[@] 10		2790.08	(10⁺)	2274.49	(8⁺)	E2[&]	R(DCO)=0.92 8.
[x]521							
526[ab]		2898.49	(10⁻)	2372.85	9⁻		
528[ab]		2943?		2415.0?			
528.84[@] 10	0.5 3	3318.97	(12⁺)	2790.08	(10⁺)	E2[&]	R(DCO)=0.98 9.
530.9[@] 1	0.5 3	2274.49	(8⁺)	1743.57	(6⁺)	E2[&]	R(DCO)=1.15 10, A_p=0.22 14.
534.62[@] 10	0.8 4	2108.71	7⁺	1574.10	5⁺	E2[&]	R(DCO)=1.09 10.
536[ab]		2898.49	(10⁻)	2362.54	8⁻		
536[a]		3545.0?	(12⁻)	3009.0	(10⁻)		
537.45[@] 15		2274.49	(8⁺)	1737.02	8⁺		Mult.: M1+E2 with no given evidence (2019Ma70).
540.8 1	8.2 8	3518.66	14⁻	2977.87	12⁻	E2	DCO(Q)=1.06 19, IPDCO=+0.16 7, R(θ)=2.32 11 (2019Sa61).
544.9 2	3.4 10	3423.1	13⁻	2878.25	11⁻	E2	DCO(Q)=0.85 16, IPDCO=+0.18 17, R(θ)=1.97 11 (2019Sa61).
550.79[@] 10	0.5 3	3869.76	(14⁺)	3318.97	(12⁺)		Mult.: E2 with no given evidence (2019Ma70).
553.5 2	2.8 8	2480.77	9⁻	1927.21	7⁻	E2	DCO(Q)=0.94 17, R(θ)=2.11 15 (2019Sa61).
555[ab]		3682.7?	(13⁻)	3127.5?	(11⁻)		
561.6 1	11.0 11	3757.52	15⁻	3195.92	13⁻	E2	DCO(Q)=1.97 25, IPDCO=+0.17 8, R(θ)=2.11 14 (2019Sa61).
565.6 2	1.3 4	3329.87	(12⁻)	2764.20	11⁻		
566.18 10		2840.65	(10⁺)	2274.49	(8⁺)		Mult.: E2 with no given evidence (2019Ma70).
567.0 2	2.1 6	3896.9	(14⁻)	3329.87	(12⁻)		
567.6	2.0	4025.1	(14⁻,15⁺)	3457.5	(12⁻,13⁺)		
577.16[@] 10		820.44	2⁺	243.19	2⁺	M1+E2[&]	R(DCO)=0.77 6, A_p=−0.05 16 (2019Ma70).
578.4 1	18.0 18	4427.61	18⁺	3849.21	16⁺	E2	R(θ)=2.74 21 (2019Sa61).
586.6 1	33.9 17	2961.00	12⁺	2374.52	10⁺	E2	DCO(Q)=0.87 4, IPDCO=+0.12 1, R(θ)=2.23 5 (2019Sa61).
589.38 12	73.0 22	1737.02	8⁺	1147.36	6⁺	E2	Eγ: unweighted average of 589.5 1 (2019Sa61) and 589.27 10 (2019Ma70). DCO(Q)=1.04 9, IPDCO=+0.10 1, R(θ)=2.34 4 (2019Sa61).
592.47[@] 10	0.10 5	2701.04	9⁺	2108.71	7⁺	E2	Mult.: E2 with no given evidence (2019Ma70).
596.37[@] 10		1743.57	(6⁺)	1147.36	6⁺	D(+Q)	R(DCO)=0.72 6 (2019Ma70).

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(HI,xnγ) 2019Sa61,2019Ma70,1987By04 (continued)

γ(^{160}Yb) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [#]	Comments
							Mult.: M1+E2 adopted by 2019Ma70 based on DCO which however better fits D(+Q).
598[ab]		2649.3?	(8⁻)	2050.47	(6⁻)		
600[ab]		2527.64	(8⁻)	1927.21	7⁻		
605.9 *2*	2.1 *6*	4029.0	15$^{(-)}$	3423.1	13⁻	(E2)	R(θ)=2.26 *18* (2019Sa61).
606.0 *2*	0.4 *2*	4475.8	(16⁺)	3869.76	(14⁺)		
608.1 *1*	14.1 *14*	3745.97	14⁺	3137.74	12⁺		
616.71[@] *10*	2.7 *8*	1255.67	(4⁺)	638.69	4⁺	(M1+E2)	R(DCO)=0.78 *7*, A_p=−0.15 *12* (2019Ma70). DCO(Q)=0.56 *15*, IPDCO=+0.25 *18*, R(θ)=1.21 *13* (2019Sa61). Mult.: contradictory assignments: M1+E2 (2019Ma70) versus E1 (2019Sa61).
625.2 *2*	4.7 *14*	2362.54	8⁻	1737.02	8⁺	(E1)	DCO(Q)=1.34 *27*, IPDCO=−0.07 *10*, R(θ)=2.86 *16* (2019Sa61).
628[ab]		4310.7?	(15⁻)	3682.7?	(13⁻)		
629.71[@] *10*	0.10 *5*	3330.75	11⁺	2701.04	9⁺	E2[&]	R(DCO)=1.03 *9*.
630.0 *1*	10.3 *10*	4375.97	16⁺	3745.97	14⁺	E2	R(θ)=2.54 *58* (2019Sa61).
635.8 *1*	5.9 *12*	2372.85	9⁻	1737.02	8⁺	E1	DCO(Q)=0.59 *11* (2019Sa61).
637.26 *24*	49.8 *25*	2374.52	10⁺	1737.02	8⁺	E2	E_γ: unweighted average of 637.5 *1* (2019Sa61) and 637.03 *10* (2019Ma70). DCO(Q)=0.82 *9*, IPDCO=+0.13 *5* (2019Sa61).
646		3009.0	(10⁻)	2362.54	8⁻		
646[ab]		3127.5?	(11⁻)	2480.77	9⁻		
647.9	1.5	5332.0	(18⁻,19⁺)	4684.1	(16⁻,17⁺)		
648.0 *2*	1.2 *4*	5203.9	(18⁻)	4555.9	(16⁻)		
650.5	1.5	3024.8	(10⁻,11⁺)	2374.52	10⁺		
654	0.6	5368.3		4714.3	(18⁺)		E_γ: from 1983Ri10.
654.1 *2*	4.9 *15*	4172.74	16⁻	3518.66	14⁻	E2	DCO(Q)=1.06 *16*, IPDCO=+0.13 *8*, R(θ)=2.18 *14* (2019Sa61).
659[ab]		3423.1	13⁻	2764.20	11⁻		
659.0 *2*	2.1 *6*	4555.9	(16⁻)	3896.9	(14⁻)		
659.0	1.9	4684.1	(16⁻,17⁺)	4025.1	(14⁻,15⁺)		
660.0 *2*	1.5 *5*	5036.0	(18⁺)	4375.97	16⁺		
663.7 *1*	12.7 *13*	5091.3	20⁺	4427.61	18⁺	E2	DCO(Q)=0.72 *5*, IPDCO=+0.18 *7*, R(θ)=2.21 *14* (2019Sa61).
671.4 *2*	3.4 *10*	4428.93	17⁻	3757.52	15⁻	E2	DCO(Q)=0.73 *11*, IPDCO=+0.11 *11*, R(θ)=2.64 *22* (2019Sa61).
672[ab]		2415.0?		1743.57	(6⁺)		
673.4 *2*	1.5 *5*	4702.5	17$^{(-)}$	4029.0	15$^{(-)}$	(E2)	R(θ)=2.03 *17* (2019Sa61).
681[ab]		4990.3?	(17⁻)	4310.7?	(15⁻)		
686.00[@] *12*		4015.87	(13⁺)	3330.75	11⁺		Mult.: E2 with no given evidence (2019Ma70).
688.0 *2*	1.0 *5*	6380.9	22⁻	5692.9	20⁻	E2	
696[ab]		1952.0?		1255.67	(4⁺)		
704[b]		1524?	(3⁻)	820.44	2⁺		
704[ab]		2272.0?	7⁻	1567.86	(5⁻)		
704.1 *2*	0.7 *4*	5406.6	(19)⁻	4702.5	17$^{(-)}$		
711.7 *2*	0.4 *2*	7092.6	24⁻	6380.9	22⁻		
717.6 *2*	0.4 *2*	6124.2	(21)⁻	5406.6	(19)⁻		
736.4 *1*	5.8 *12*	5827.7	22⁺	5091.3	20⁺	(E2)	DCO(Q)=1.39 *18*, IPDCO=+0.15 *11*, R(θ)=2.52 *15* (2019Sa61).
739.2 *2*	2.9 *9*	4911.9	18⁻	4172.74	16⁻	E2	DCO(D)=1.87 *23*, IPDCO=+0.18 *8*, R(θ)=2.31 *36* (2019Sa61).
743.7 *1*	12.6 *13*	2480.77	9⁻	1737.02	8⁺	E1	α(K)exp=0.0030 *8* (1980Ri02)

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(HI,xnγ) 2019Sa61,2019Ma70,1987By04 (continued)

γ(^{160}Yb) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	Comments
							DCO(Q)=0.43 *6*, IPDCO=+0.24 *17*, R(θ)=1.46 *10* (2019Sa61).
[x]744	2.0						1983Ri10 place this γ between the 20^- and 18^- members of the negative-parity, signature-0, side band. 1987By04, however, report that this 20^- state is depopulated by an 781γ.
746.3 *2*	0.5 *3*	6694.3	$(23)^-$	5948.0	$(21)^-$	E2	
748.0 *2*	2.0 *6*	5176.9	$(19)^-$	4428.93	17^-	(E2)	DCO(Q)=0.51 *17*, R(θ)=2.01 *23* (2019Sa61).
751[ab]		3329.87	(12^-)	2578.80	10^-		
752[ab]		3127.5?	(11^-)	2374.52	10^+		
754[ab]		3127.5?	(11^-)	2372.85	9^-		
763.1 *1*	12.9 *39*	3137.74	12^+	2374.52	10^+	E2	R(θ)=1.97 *22* (2019Sa61).
765.0 *2*	0.4 *2*	7459.3	$(25)^-$	6694.3	$(23)^-$	E2	
771.1 *2*	0.6 *3*	5948.0	$(21)^-$	5176.9	$(19)^-$	(E2)	R(θ)=2.49 *25* (2019Sa61).
775.9[b]	1.4	2704.0	$(8^-,9^+)$	1927.21	7^-		
778.0 *2*	0.3 *2*	7870.6	26^-	7092.6	24^-	E2	
779.7 *1*	8.9 *18*	1927.21	7^-	1147.36	6^+	E1	α(K)exp=0.0020 *9* (1980Ri02) DCO(Q)=0.44 *5*, IPDCO=+0.11 *11*, R(θ)=1.11 *5* (2019Sa61).
781.0 *2*	1.0 *5*	5692.9	20^-	4911.9	18^-		
785.1 *1*	6.8 *14*	3745.97	14^+	2961.00	12^+		
790.6 *2*	2.2 *7*	2527.64	(8^-)	1737.02	8^+		
792[ab]		2718.4?	(9^-)	1927.21	7^-		
795.6 *2*	4.1 *12*	6623.3	24^+	5827.7	22^+	E2	DCO(Q)=0.74 *10*, IPDCO=+0.05 *8*, R(θ)=2.57 *8* (2019Sa61).
804[ab]		3682.7?	(13^-)	2878.25	11^-		
806[ab]		1629.0?		820.44	2^+		
809.89 *12*		1957.43	6^+	1147.36	6^+	D(+Q)	R(DCO)=0.54 *5*. Mult.: M1+E2 adopted by 2019Ma70 based on DCO which however better fits D(+Q).
813		8272.3	$(27)^-$	7459.3	$(25)^-$		
820.44[@] *10*		820.44	2^+	0.0	0^+	E2[&]	R(DCO)=0.98 *10*, A_p=0.84 *25* (2019Ma70).
830.7 *2*	1.6 *5*	8289.7	28^+	7459.0	26^+		
833[ab]		4029.0	$15^{(-)}$	3195.92	13^-		
835.7 *2*	2.6 *8*	7459.0	26^+	6623.3	24^+	E2	
837.0 *2*	1.6 *5*	9126.7	30^+	8289.7	28^+		
838.0 *2*	0.2 *1*	8708.6	28^-	7870.6	26^-	E2	
839[ab]		1952.0?		1112.80	3^+		
847.0 *2*	0.10 *5*	9555.6	$(30)^-$	8708.6	28^-		
853		10408.7	$(32)^-$	9555.6	$(30)^-$		
860		9132.3	$(29)^-$	8272.3	$(27)^-$		
865.1 *2*	0.5 *3*	4714.3	(18^+)	3849.21	16^+		
869.61[@] *10*	0.6 *3*	1112.80	3^+	243.19	2^+	(M1+E2)[&]	R(DCO)=0.69 *6*, A_p=0.07 *12*.
877		10003.7	32^+	9126.7	30^+		
877		10887.3	$(33)^-$	10010.3	$(31)^-$		
878		10010.3	$(31)^-$	9132.3	$(29)^-$		
885		11293.7	$(34)^-$	10408.7	$(32)^-$		
886[b]		1524?	(3^-)	638.69	4^+		
902.9 *2*	1.8 *5*	2050.47	(6^-)	1147.36	6^+	E1	DCO(Q)=0.76 *14*, R(θ)=2.35*35* (2019Sa61). See comment at 483γ.
903		11790.4	$(35)^-$	10887.3	$(33)^-$		
903.6	2.2	2050.78	$(6)^-$	1147.36	6^+		See comment at 483γ.
929.4 *2*	1.1 *3*	1567.86	(5^-)	638.69	4^+	E1	R(θ)=0.98 *27* (2019Sa61).

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(HI,xnγ) 2019Sa61,2019Ma70,1987By04 (continued)

γ(^{160}Yb) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	Comments
929.6	1.3	1567.5	(4)$^-$	638.69	4$^+$		
935		12228.7	(36)$^-$	11293.7	(34)$^-$		
935.43[@] *10*	0.9 *5*	1574.10	5$^+$	638.69	4$^+$		R(DCO)=0.58 *5*, A_p=0.24 *8* (2019Ma70). Mult.: M1+E2 adopted by 2019Ma70 based on DCO which however based on polarization better fits E1(+M2).
950		12740.4	(37)$^-$	11790.4	(35)$^-$		
953.34[@] *15*		1591.83	4$^+$	638.69	4$^+$		R(DCO)=0.95 *12*. Mult.: M1+E2 adopted by 2019Ma70 based on DCO which however better fits Q,E2.
954		10957.7	34$^+$	10003.7	32$^+$		
961.51[@] *11*		2108.71	7$^+$	1147.36	6$^+$		A_p=0.44 *15*. Mult.: M1+E2 adopted by 2019Ma70 based on polarization which however does not exclude E1 or E2.
963.71[@] *15*		2701.04	9$^+$	1737.02	8$^+$		A_p=0.44 *15*. Mult.: M1+E2 adopted by 2019Ma70 based on polarization which however does not exclude E1 or E2.
966.4[b]	0.3	2704.0	(8$^-$,9$^+$)	1737.02	8$^+$		
982[ab]		2718.4?	(9$^-$)	1737.02	8$^+$		
1000		13228.7	(38)$^-$	12228.7	(36)$^-$		
1000		13740	(39)$^-$	12740.4	(37)$^-$		
1007		11964.7	36$^+$	10957.7	34$^+$		
1011[ab]		4375.97	16$^+$	3365.11	14$^+$		
1012.67[@] *11*		1255.67	(4$^+$)	243.19	2$^+$		A_p=−0.20 *27* (2019Ma70). Mult.: 2019Ma70 adopted electric character based on polarization measurement there is no proof that this is a ΔJ=2 Q transition.
[x]1014							
[x]1040							
1048.65[@] *15*		1292.05	(2$^+$)	243.19	2$^+$		Mult.: M1+E2 with no given evidence (2019Ma70).
1053.14[@] *11*	0.3 *2*	2790.08	(10$^+$)	1737.02	8$^+$		Mult.: E2 with no given evidence (2019Ma70).
1056.2 *2*	0.7 *4*	1694.73	(4$^-$)	638.69	4$^+$		
1061[b]		14290?	(40$^-$)	13228.7	(38)$^-$		
1078		13042.7	38$^+$	11964.7	36$^+$		
1104.52[@] *33*		1743.57	(6$^+$)	638.69	4$^+$		A_p=0.17 *40* (2019Ma70). Mult.: electric character based on polarization adopted by 2019Ma70 as E2 which however does not exclude E1.
1104.52 *33*		2840.65	(10$^+$)	1737.02	8$^+$		Mult.: E2 with no given evidence (2019Ma70).
1113[b]		15403?	(42$^-$)	14290?	(40$^-$)		
1114[ab]		1358.2?	(3$^-$)	243.19	2$^+$		
1124[ab]		2272.0?	7$^-$	1147.36	6$^+$		
1127.35[@] *16*		2274.49	(8$^+$)	1147.36	6$^+$		Mult.: E2 with no given evidence (2019Ma70).
1135.5 *2*	0.4 *2*	4984.7	(17$^+$)	3849.21	16$^+$		
1158		14200.7	40$^+$	13042.7	38$^+$		
1216.91[@] *11*	0.2 *1*	2364.37	8$^+$	1147.36	6$^+$	E2[&]	R(DCO)=0.97 *10*.
1267[ab]		2415.0?		1147.36	6$^+$		
1292.01[@] *21*		1292.05	(2$^+$)	0.0	0$^+$		Mult.: E2 with no given evidence (2019Ma70).
1318.74[@] *11*		1957.43	6$^+$	638.69	4$^+$	E2[&]	R(DCO)=0.92 *9*.

Continued on next page (footnotes at end of table)

(HI,xnγ) 2019Sa61,2019Ma70,1987By04 (continued)

γ(^{160}Yb) (continued)

E_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Comments
1348.65[@] *15*	1591.83	4+	243.19	2+	Mult.: E2 with no given evidence (2019Ma70).

[†] Unless otherwise mentioned from 2019Sa61 who quoted ΔE_γ=0.1-0.2 keV intepreted by evaluator as 0.1 keV for γ rays with $I_\gamma \geq 5\%$ and 0.2 keV for γ rays with $I_\gamma<5\%$. Values quoted to 0.1 keV without uncertainties are from 1983Ri10 (also given in 1980Ri08 and 1980Ri02), and other values (with no decimal and no uncertainties) are from 1987By04 and from 2005Ba88, 2010Ba02, and 2010Ba25, respectively. Of these, 1987By04 went to highest excitation energies and spin-parity values and conseqently the Eγ's of the upper parts of the bands are generally from this reference, while 2005Ba88, 2010Ba02, and 2010Ba25 (but also 1987By04), explored more the lower excitation energy and lower spin-parity region. However many of these low-lying γ's are not confirmed by 2019Sa61 (see general comment above). When common, data from 1987By04 are generally preferred (because it appers they had better statistics). Only 2005Ba88 found the Eγ's grouped in the γ-vibrational and β-vibrational positive-parity bands, respectively (as well as the band with unassigned J^π values).

[‡] Most values are from 2019Sa61 who quoted $\Delta I_\gamma \approx 3\%$ of I_γ as from fit, and going to ≈30% or ≈50% for weak transitions. This is intepreted by evaluator as: 50% for $I_\gamma<1\%$, 30% for I_γ in between 1-5%, 20% for I_γ in between 5-10%, 10% for I_γ in between 10-30%, 5% for I_γ in between 30-50%, and 3% for I_γ in between 50-100%, respectively. For 16 γ's, from Table 1 (Measured branching ratios) of 2019Sa61.

[#] Unless otherwise mentioned from 2019Sa61 based on DCO, IPDCO (polarization) and R(θ) measurements. Values considered by authors under parentheses when no measurements are not adopted by evalutor. 2010Ba02 also mention DCO ratios and polarization anisotropies measurements; however no evidence is given and no multipolarities are explicitly adopted by authors (nor by evaluator). Values from other sources are mentioned in comments.

[@] From 2019Ma70.

[&] From 2019Ma70 based on DCO, linear polarization measurements.

[a] γ-ray placement given by 2010Ba02 (negative parities) or 2005Ba88 (positive parities) not confirmed by 2019Sa61 (with $\gamma\gamma\gamma$ analysis) listed by evaluator as questionable.

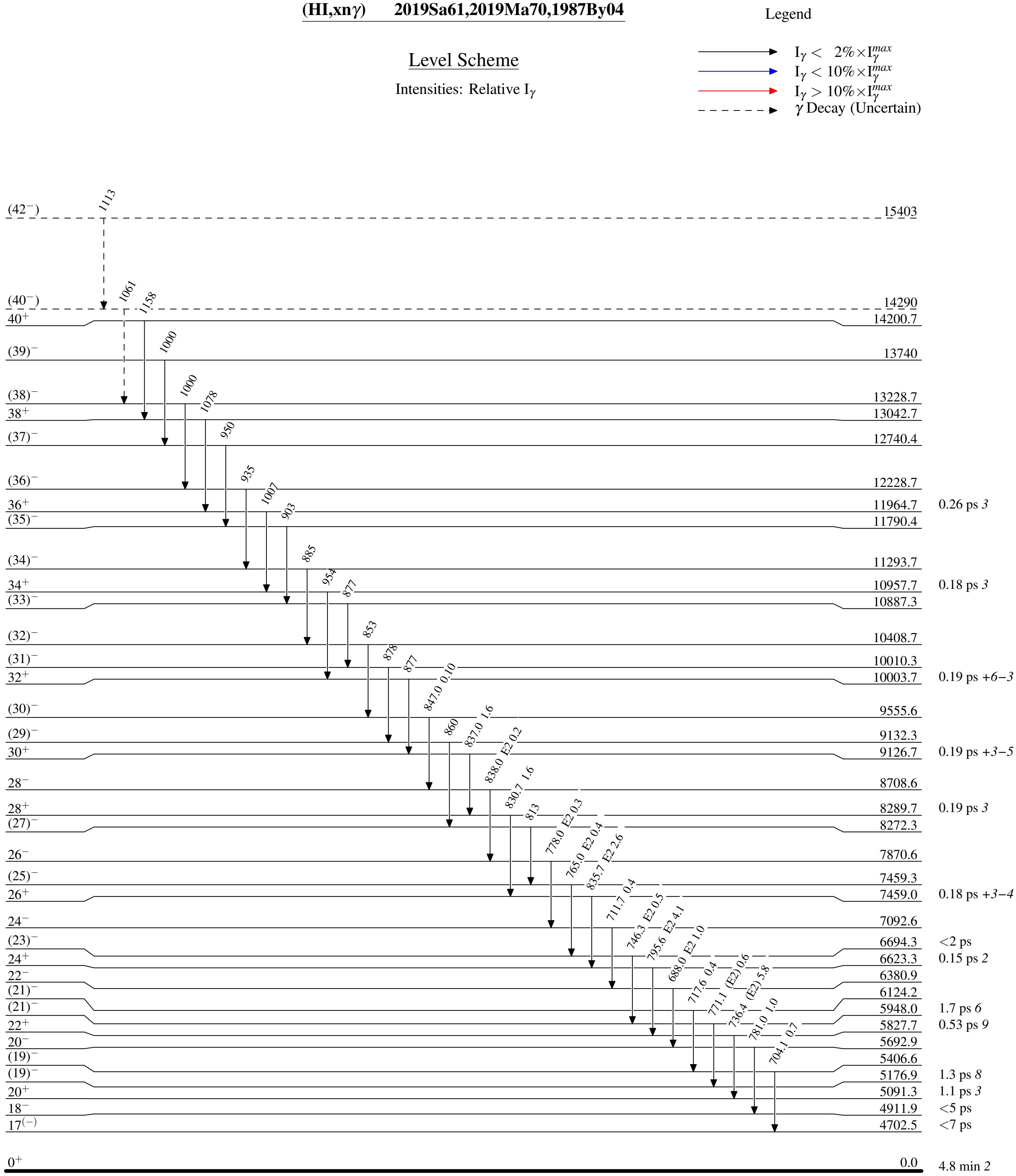
[b] Placement of transition in the level scheme is uncertain.

[x] γ ray not placed in level scheme.

(HI,xnγ) 2019Sa61,2019Ma70,1987By04

Level Scheme

Intensities: Relative I_γ

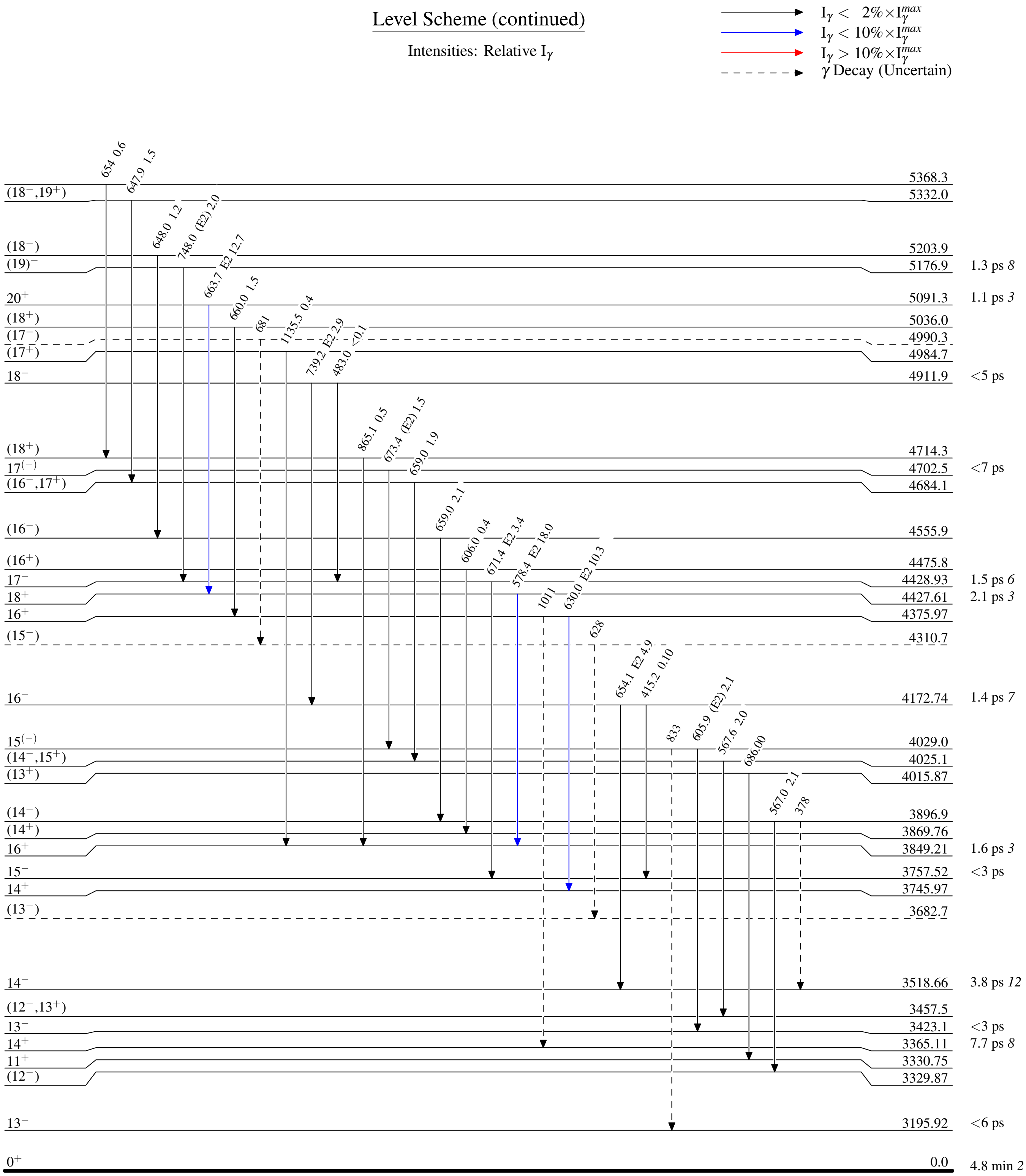


$^{160}_{70}Yb_{90}$

(HI,xnγ) 2019Sa61,2019Ma70,1987By04

Level Scheme (continued)

Intensities: Relative I_γ



$^{160}_{70}Yb_{90}$

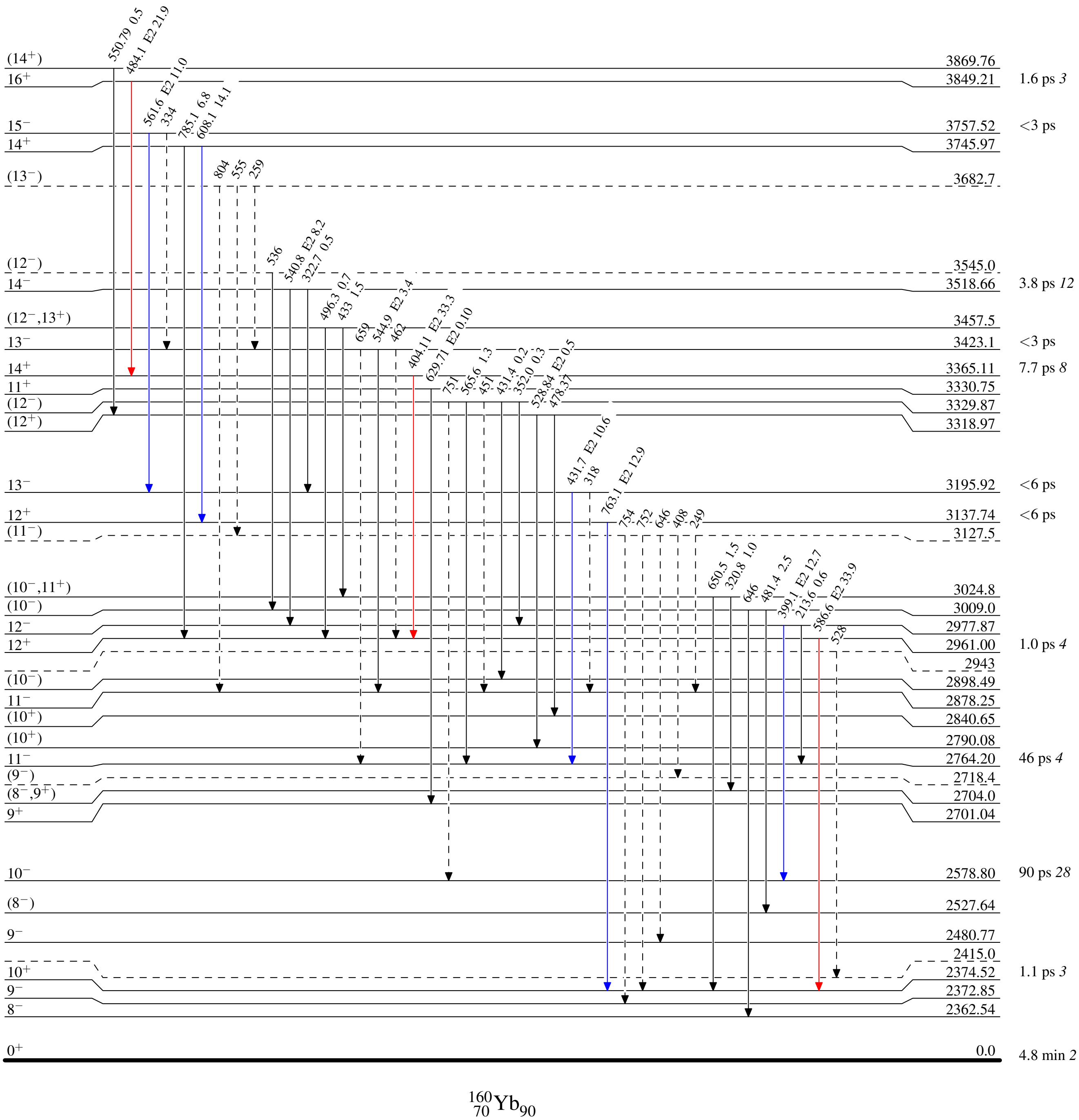
(HI,xnγ) 2019Sa61,2019Ma70,1987By04

Level Scheme (continued)

Intensities: Relative I_γ

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)

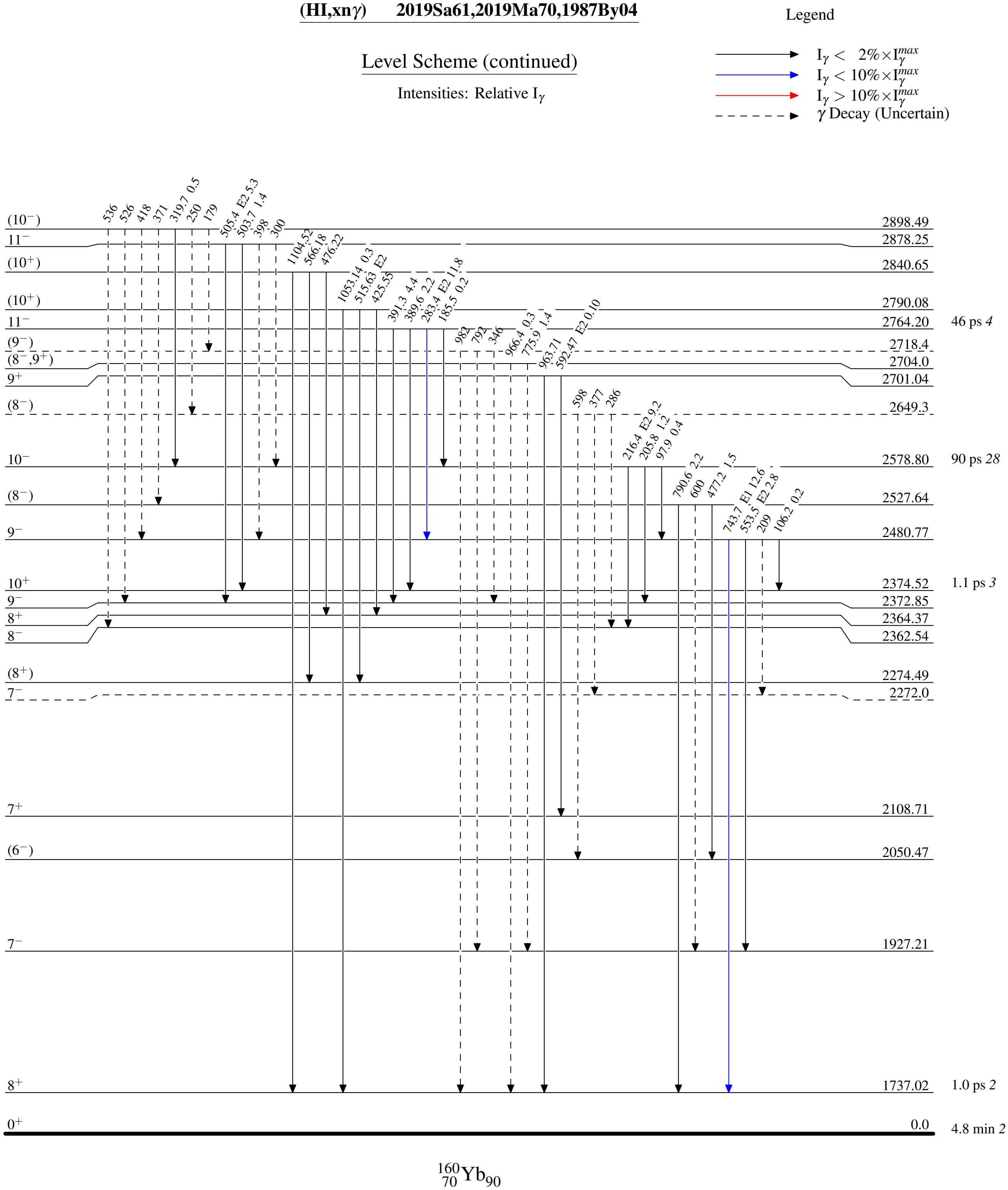


$^{160}_{70}Yb_{90}$

(HI,xnγ) 2019Sa61,2019Ma70,1987By04

Level Scheme (continued)

Intensities: Relative I_γ



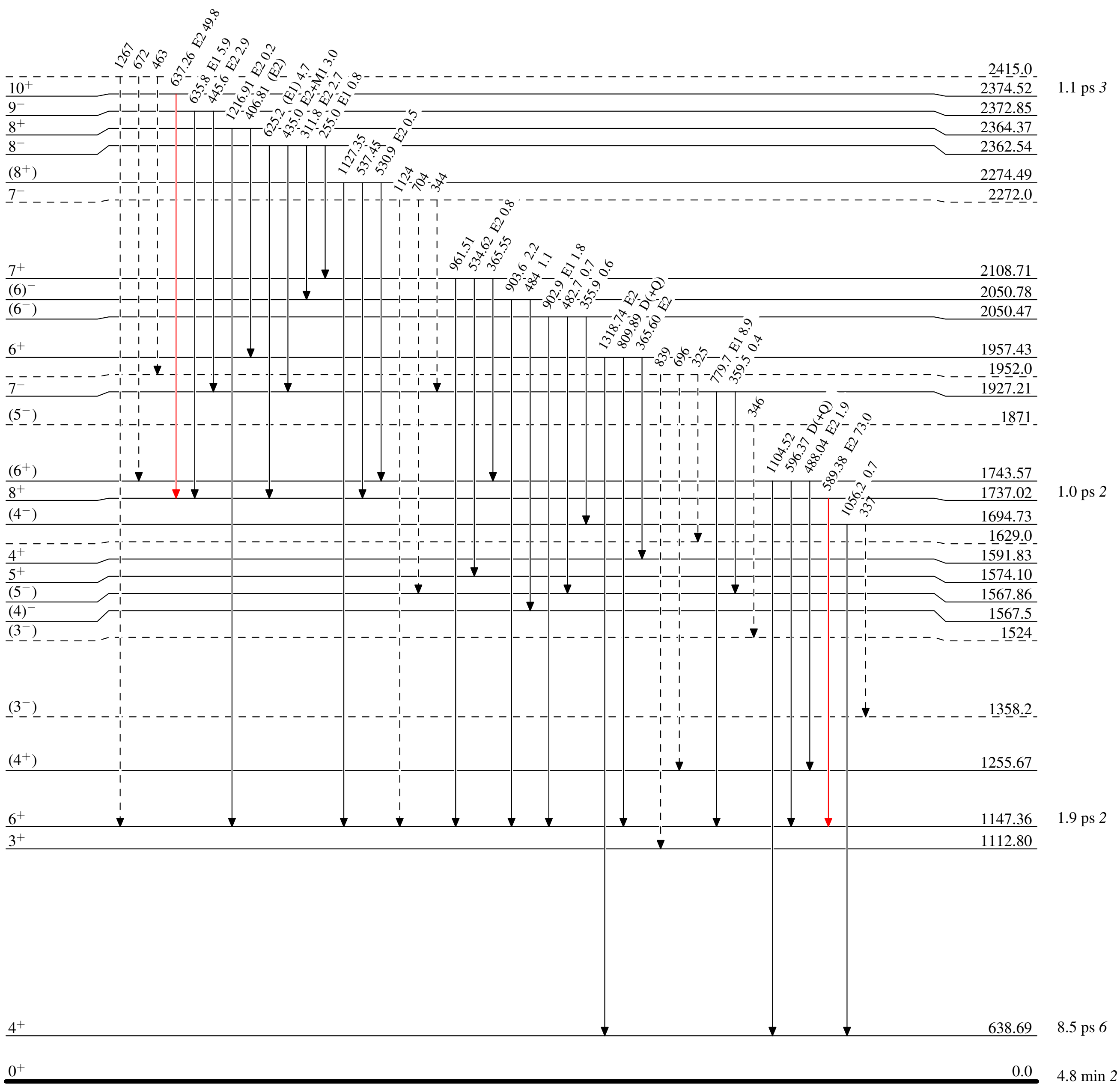
(HI,xnγ) 2019Sa61,2019Ma70,1987By04

Level Scheme (continued)

Intensities: Relative I_γ

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)

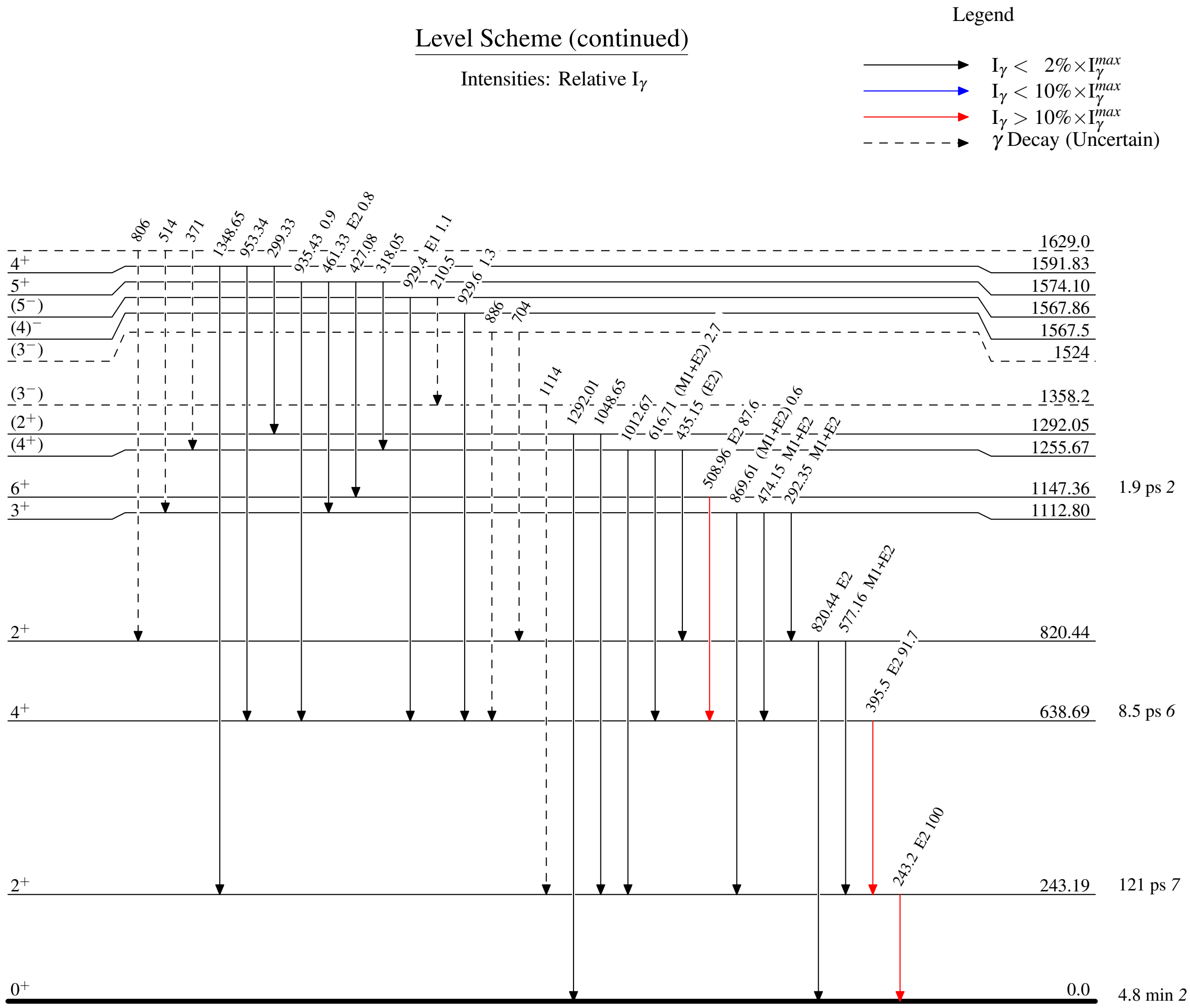


$^{160}_{70}Yb_{90}$

(HI,xnγ) 2019Sa61,2019Ma70,1987By04

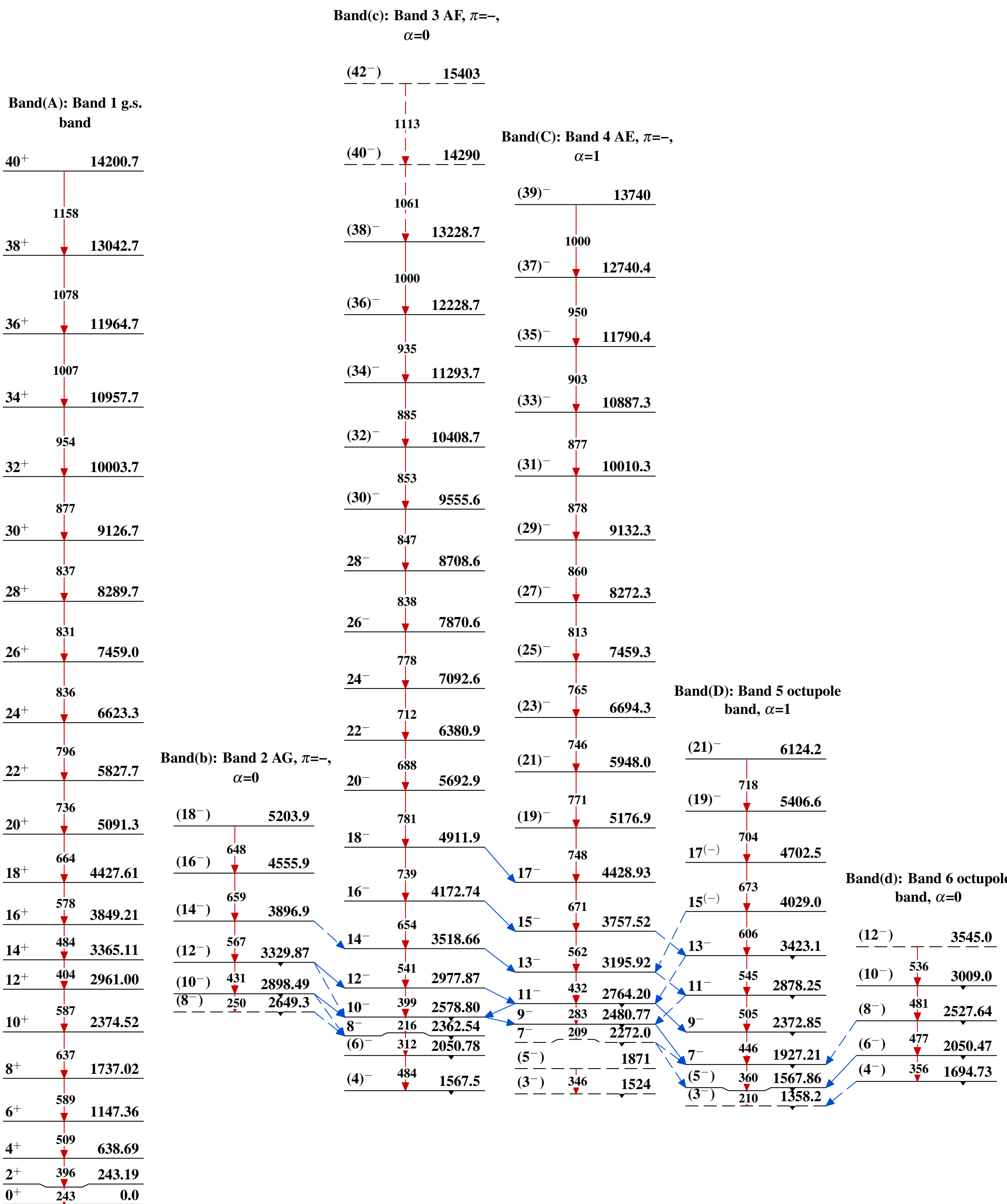
Level Scheme (continued)

Intensities: Relative I_γ



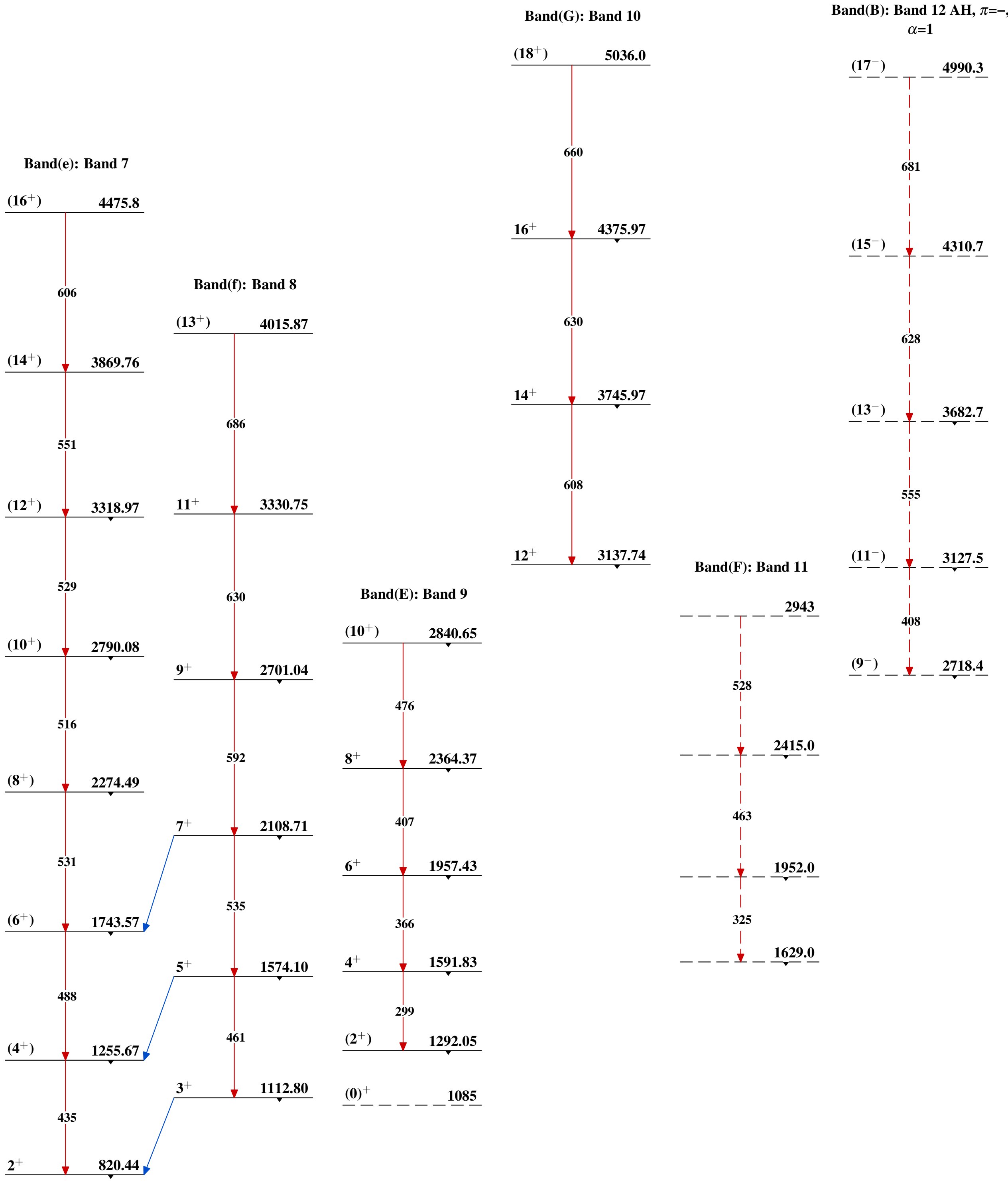
$^{160}_{70}Yb_{90}$

(HI,xnγ) 2019Sa61,2019Ma70,1987By04



$^{160}_{70}Yb_{90}$

(HI,xnγ) 2019Sa61,2019Ma70,1987By04 (continued)



$^{160}_{70}Yb_{90}$

(HI,xnγ) 2019Sa61,2019Ma70,1987By04 (continued)