(HI,xnγ) 2001Ko44,2017Ve03,2014AlZX

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 159, 1 (2019)	30-Aug-2019

2001Ko44: Produced using the ^{96}Mo(^{84}Sr,p2nγ) reaction. E(^{84}Sr)=380 MeV. Target: ^{96}Mo, 700 μg/cm^2 thick, 96.8 % enriched. Detectors: Argonne Fragment Mass Analyzer, Parallel Grid Avalanche Counter, 40x40 strips Double-sided Silicon Strip Detector (DSSD), Gammasphere gamma-ray spectrometer, 4 large volume HPGe detectors and a single low-energy photon spectrometer (LEPS) detector placed around the DSSD. Recoil decay tagging technique. Measured: mass- and α-gated Eγ, Iγ and $\gamma\gamma$ coin; mass-gated Eα, Iα, α(t), $\alpha\gamma$ coin, Eα(parent)-Eα(daughter) correlations, $T_{1/2}$. Others (the same collaboration): 2001Ko13, 2003CaZZ, and 2005CaZY. The complementary information from 2001Ko44 is given in 2001KoZO.

2014AlZX,2017Ve03: Produced using the ^{92}Mo(^{88}Sr,p2nγ) reaction. E(^{88}Sr)=399 MeV. Target: ^{92}Mo, 600 μg/cm^2 thick, 98 % enriched. Detectors: RITU gas-filled recoil separator, multiwire proportional counter, double-sided silicon strip detector, JUROGAM-II array, consisting of 24 clover- and 15 EUROGAM-type Compton-suppressed HPGe detectors. Recoil decay tagging technique. Measured: α-gated Eγ, Iγ and $\gamma\gamma$ coin.

The spin assignments for the well-deformed 11/2$^-$[505] ($h_{11/2}$) band differ in 2017Ve03 and 2014AlZX, albeit they are from the same collaboration. The 2014AlZX assignments are identical to those in 2001Ko44, 2001KoZO. While the 2017Ve03 values are adopted in the present evaluation (primary reference), the spins are likely higher, otherwise the band is not close to the yrast line, which would result in much lower population in (HI,xnγ).

^{177}Au Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	Comments
0.0	1/2$^+$	1.501 s *20*	J$^\pi$,$T_{1/2}$: From Adopted Levels. Values in (HI,xnγ): 1.462 s *32* (2001Ko44) and 1.511 s *13* (2014AlZX), using α(t). configuration: $\pi(s^{-1}_{1/2})$ orbital.
24.9 *3*	(3/2$^+$)		
182.7[&] *5*	(11/2$^-$)	1.193 s *13*	$T_{1/2}$: From Adopted Levels. Values in (HI,xnγ): 1.180 s *12* (2001Ko44) and 1.205 s *11* (2014AlZX), using α(t). configuration: $\pi(h^{-1}_{11/2})$, spherical (weakly-deformed) shape.
290.3 *3*	(5/2$^+$)		
423.6[#] *5*	(9/2$^-$)	≤15 ns	$T_{1/2}$: Estimated from intensity balance considerations (2001Ko44).
703.5[&] *7*	(13/2$^-$)		
706.6[&] *7*	(15/2$^-$)		
713.5[#] *5*	(13/2$^-$)		
743.0 *4*	(9/2$^+$)		
743.0+x[@] *5*	(13/2$^+$)		Additional information 1.
903.10+x[@] *10*	(17/2$^+$)		
931.0[a] *7*	(11/2$^-$)		
1096.2[#] *6*	(17/2$^-$)		
1102.6[a] *7*	(13/2$^-$)		
1160.40+x[@] *15*	(21/2$^+$)		
1305.6[a] *7*	(15/2$^-$)		
1430.7[&] *9*	(17/2$^-$)		
1499.40+x[@] *18*	(25/2$^+$)		
1526.2[a] *8*	(17/2$^-$)		
1532.0[#] *7*	(21/2$^-$)		
1577.4[&] *9*	(19/2$^-$)		
1758.3[a] *8*	(19/2$^-$)		
1909.30+x[@] *20*	(29/2$^+$)		
2004.3[a] *8*	(21/2$^-$)		
2020.2[#] *7*	(25/2$^-$)		

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(HI,xnγ) 2001Ko44,2017Ve03,2014AlZX (continued)

^{177}Au Levels (continued)

E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]
2262.5[a] *9*	(23/2⁻)	2810.3[a] *11*	(27/2⁻)	3480.6+x[@] *4*	(41/2⁺)	5444.3+x[@] *6*	(53/2⁺)
2381.20+x[@] *23*	(33/2⁺)	2907.10+x[@] *25*	(37/2⁺)	3709.0?[#] *14*	(37/2⁻)	6158.2+x?[@] *12*	(57/2⁺)
2533.2[a] *9*	(25/2⁻)	3100.4[a] *11*	(29/2⁻)	4096.3+x[@] *4*	(45/2⁺)		
2553.8[#] *8*	(29/2⁻)	3121.0[#] *10*	(33/2⁻)	4753.3+x[@] *5*	(49/2⁺)		

[†] From a least-squares fit to Eγ.
[‡] From the deduced γ-ray transition multipolarities and the observed band structures, unless otherwise stated.
[#] Band(A): π1/2[541] ($h_{9/2}$) band.
[@] Band(B): π1/2[660] ($i_{13/2}$) band.
[&] Seq.(D): Spherical (weakly-deformed) $\pi h_{11/2}\otimes J^\pi$(even−even core).
[a] Band(C): Well-deformed π11/2[505] ($h_{11/2}$) band.

γ(^{177}Au)

E_i(level)	J_i^π	Eγ[†]	Iγ[†]	E_f	J_f^π	Mult.[&]	Comments
24.9	(3/2⁺)	(24.9 *3*)		0.0	1/2⁺		Eγ: From level energy differences.
290.3	(5/2⁺)	265.4[‡] *2*	60.2[@] *20*	24.9	(3/2⁺)		
		290.3[‡] *4*	30.3[@] *10*	0.0	1/2⁺		
423.6	(9/2⁻)	240.8 *3*	53 *6*	182.7	(11/2⁻)	(M1+E2)	Mult.: R(DCO)=0.9 *4* implies M1,E2.
703.5	(13/2⁻)	520.7[#] *5*	68[#] *12*	182.7	(11/2⁻)	(M1+E2)	Mult.: R(DCO)=0.59 *14*.
706.6	(15/2⁻)	523.8[#] *5*	36[#] *12*	182.7	(11/2⁻)	(E2)	Mult.: R(DCO)=1.5 *5* implies M1,E2.
713.5	(13/2⁻)	289.9 *2*	94 *10*	423.6	(9/2⁻)		
743.0	(9/2⁺)	319.4 *2*	36 *4*	423.6	(9/2⁻)		
		452.7[‡] *2*	69.4[@] *22*	290.3	(5/2⁺)		
743.0+x	(13/2⁺)	(29.5+y *5*)		713.5	(13/2⁻)		Eγ: From level energy differences. Required by coincidence relationship.
903.10+x	(17/2⁺)	160.1 *1*	68 *8*	743.0+x	(13/2⁺)	E2	Mult.: From α(exp)=0.70 *7* (2001Ko44) deduced using intensity balance considerations from γγ coincidence spectrum produced by summing gates on γ rays above the J^π=(17/2⁺) level.
931.0	(11/2⁻)	227.5[#] *5*	30.9[#] *12*	703.5	(13/2⁻)	(M1+E2)	Mult.: R(DCO)=1.5 *7* and α(exp)=0.58 *23* in 2017Ve03,2014AlZX, based on the K x-ray intensity balance.
1096.2	(17/2⁻)	382.7 *3*	34 *4*	713.5	(13/2⁻)	(E2)	Mult.: R(DCO)=1.1 *3*.
1102.6	(13/2⁻)	171.6[#] *5*	10.4[#] *10*	931.0	(11/2⁻)		
		396.0[#] *5*	41[#] *6*	706.6	(15/2⁻)		
		399.1[#] *5*	12.7[#] *14*	703.5	(13/2⁻)	(M1+E2)	Mult.: R(DCO)=1.2 8 implies M1,E2.
1160.40+x	(21/2⁺)	257.3 *1*	100 *11*	903.10+x	(17/2⁺)		
1305.6	(15/2⁻)	203.0[#] *5*	15.4[#] *13*	1102.6	(13/2⁻)	(M1+E2)	Mult.: R(DCO)=1.2 *5* implies M1,E2.
		374.6[#] *5*	10.0[#] *13*	931.0	(11/2⁻)		
		599.0[#] *5*	18[#] *4*	706.6	(15/2⁻)		
1430.7	(17/2⁻)	727.2[#] *5*	14[#] *4*	703.5	(13/2⁻)		Iγ: ΔIγ=35 in 2014AlZX is probably a typo.
1499.40+x	(25/2⁺)	339.0 *1*	93 *10*	1160.40+x	(21/2⁺)	(E2)	Mult.: R(DCO)=1.02 *21*.
1526.2	(17/2⁻)	220.6[#] *5*	14.2[#] *12*	1305.6	(15/2⁻)	(M1+E2)	Mult.: R(DCO)=1.0 *4* implies M1,E2.
		423.6[#] *5*	10.1[#] *12*	1102.6	(13/2⁻)		
1532.0	(21/2⁻)	435.8 *3*	30 *4*	1096.2	(17/2⁻)		

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(HI,xnγ) 2001Ko44,2017Ve03,2014AlZX (continued)

γ(^{177}Au) (continued)

E_i(level)	J^π_i	E_γ [†]	I_γ [†]	E_f	J^π_f	Mult. [&]	Comments
1577.4	(19/2⁻)	870.8[#] *5*	31[#] *6*	706.6	(15/2⁻)		
1758.3	(19/2⁻)	232.1[#] *5*	8.7[#] *10*	1526.2	(17/2⁻)		
		452.7[#] *5*	11.5[#] *14*	1305.6	(15/2⁻)	(E2)	Mult.: R(DCO)=1.0 *7* implies M1,E2.
1909.30+x	(29/2⁺)	409.9 *1*	59 *7*	1499.40+x	(25/2⁺)	(E2)	Mult.: R(DCO)=0.82 *24* implies M1,E2.
2004.3	(21/2⁻)	245.9[#] *5*	5.6[#] *8*	1758.3	(19/2⁻)		
		478.0[#] *5*	8.8[#] *14*	1526.2	(17/2⁻)		
2020.2	(25/2⁻)	488.2 *3*	20 *3*	1532.0	(21/2⁻)		
2262.5	(23/2⁻)	258.2[#] *5*	6.8[#] *9*	2004.3	(21/2⁻)		
		504.4[#] *5*	5.1[#] *11*	1758.3	(19/2⁻)		
2381.20+x	(33/2⁺)	471.9 *1*	45 *6*	1909.30+x	(29/2⁺)		
2533.2	(25/2⁻)	270.7[#] *5*	5.6[#] *9*	2262.5	(23/2⁻)		
		528.9[#] *5*	4.8[#] *10*	2004.3	(21/2⁻)		
2553.8	(29/2⁻)	533.6 *4*	13.5 *22*	2020.2	(25/2⁻)		
2810.3	(27/2⁻)	277 *1*		2533.2	(25/2⁻)		E_γ: From 2017Ve03. Other: 280.3 keV in 2014AlZX.
		548 *1*		2262.5	(23/2⁻)		E_γ: From 2017Ve03. Other: 551.0 keV in 2014AlZX.
2907.10+x	(37/2⁺)	525.9 *1*	15 *3*	2381.20+x	(33/2⁺)		
3100.4	(29/2⁻)	290.2[#] *5*	6.4[#] *9*	2810.3	(27/2⁻)		
		567 *1*		2533.2	(25/2⁻)		E_γ: From 2017Ve03. Other: 570.4 keV in 2014AlZX.
3121.0	(33/2⁻)	567.2 *5*	8.5 *22*	2553.8	(29/2⁻)		
3480.6+x	(41/2⁺)	573.5 *2*	10.1 *19*	2907.10+x	(37/2⁺)		
3709.0?	(37/2⁻)	588.0[a] *10*	≤5	3121.0	(33/2⁻)		
4096.3+x	(45/2⁺)	615.7 *2*	5.0 *18*	3480.6+x	(41/2⁺)		
4753.3+x	(49/2⁺)	657.0 *3*	2 *1*	4096.3+x	(45/2⁺)		
5444.3+x	(53/2⁺)	691.0 *3*	≤1	4753.3+x	(49/2⁺)		
6158.2+x?	(57/2⁺)	714.0[a] *10*	≤1	5444.3+x	(53/2⁺)		

[†] From 2001Ko44, 2001KoZO. Iγ are relative to Iγ(257.3γ)=100, deduced from a γ-ray spectrum produced by gating on the Eα=6122−keV line, depopulating the J^π=(11/2⁻) isomer, unless otherwise stated.

[‡] Placement of this γ-ray in the level scheme is from 2014AlZX.

[#] From 2014AlZX. Placement of this γ-ray in the level scheme is from 2017Ve03.

[@] From 2014AlZX, relative to Iγ(257.3γ)=100, deduced from a γ-ray spectrum produced by gating on the Eα=6153−keV line, depopulating the J^π=(1/2⁺) ground state.

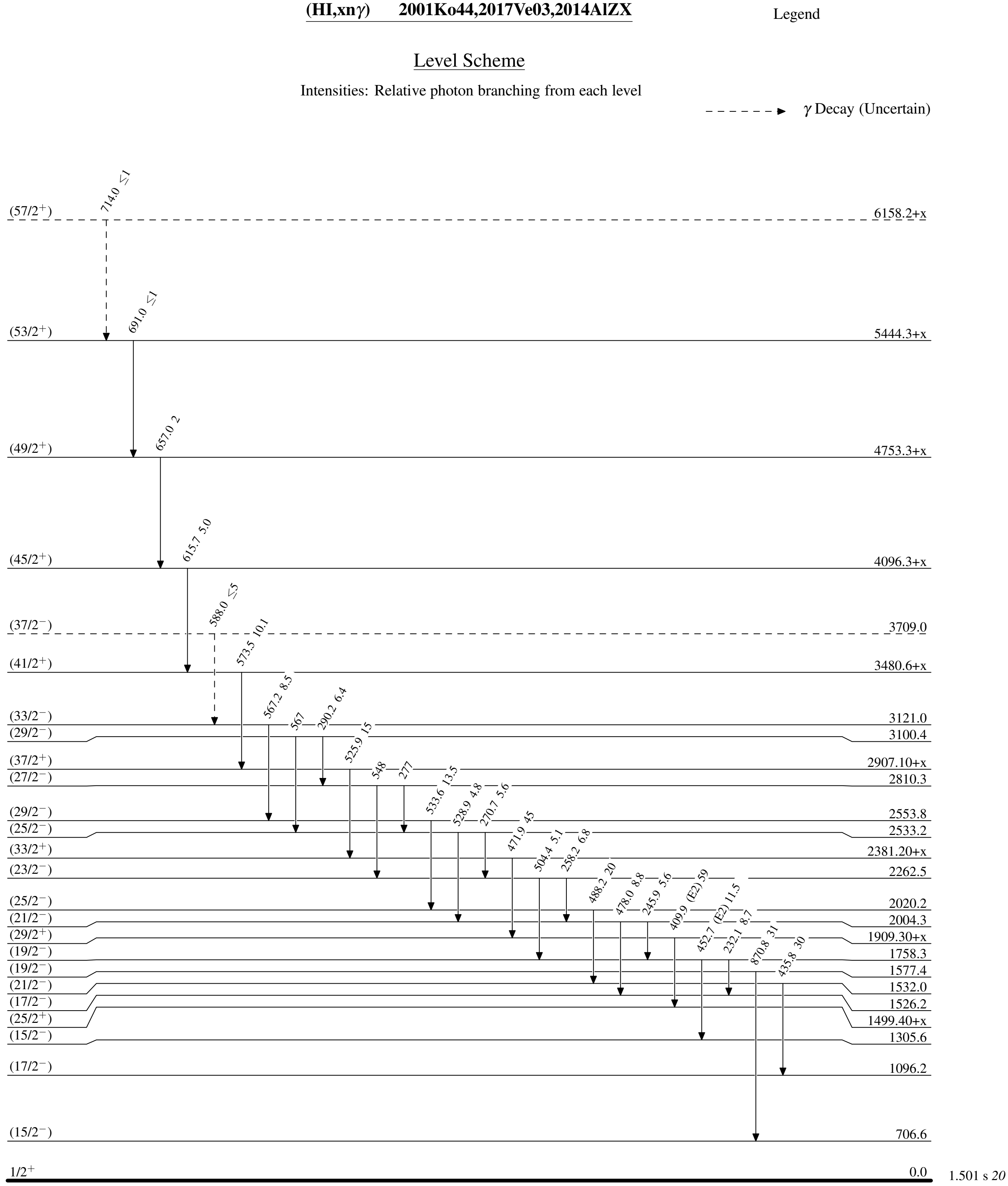
[&] From the measured DCO ratios (2014AlZX) and total electron conversion coefficients (2001Ko44,2014AlZX), and the observed band structures.

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

(HI,xnγ) 2001Ko44,2017Ve03,2014AlZX

Level Scheme

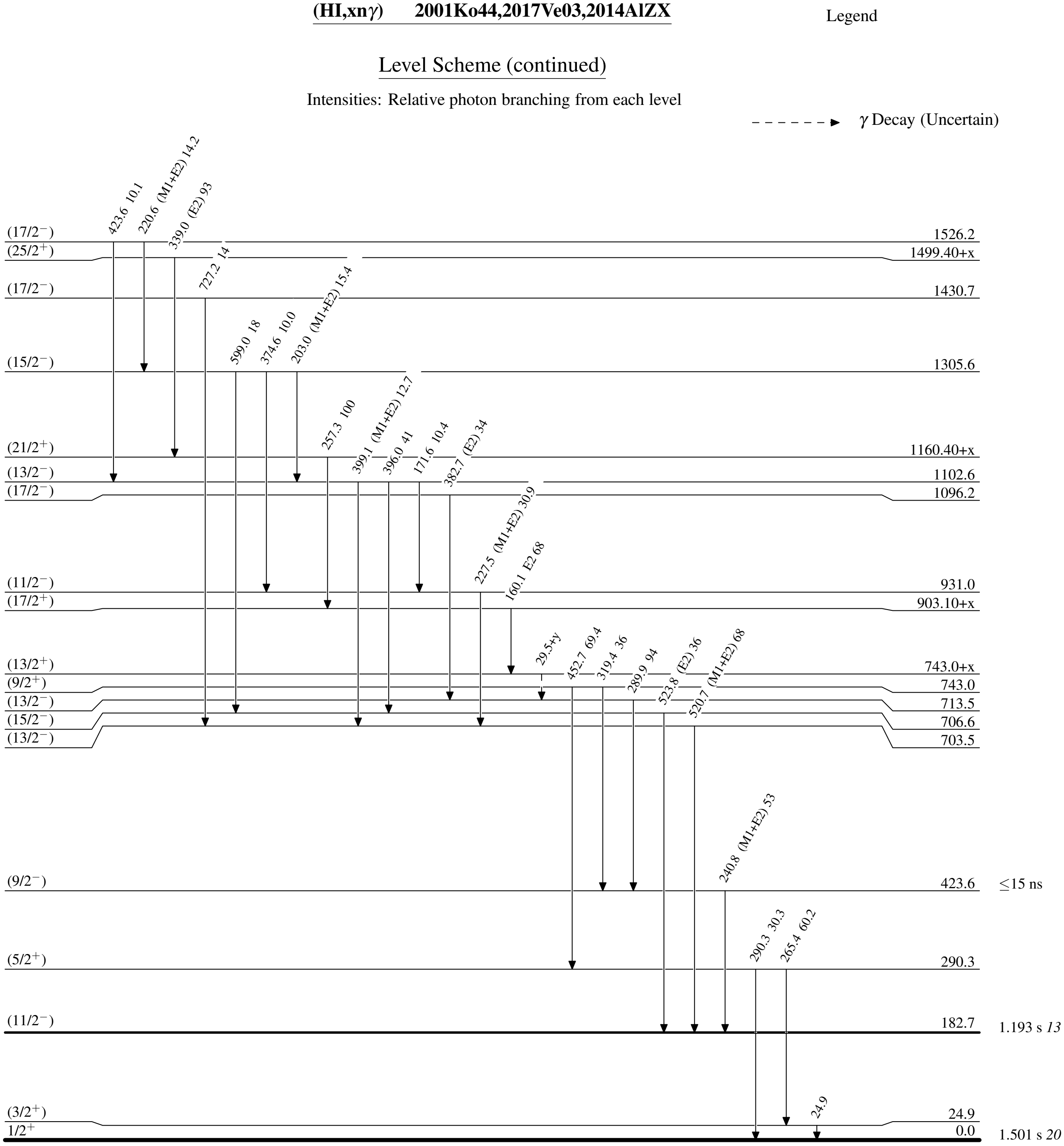
Intensities: Relative photon branching from each level



(HI,xnγ) 2001Ko44,2017Ve03,2014AlZX

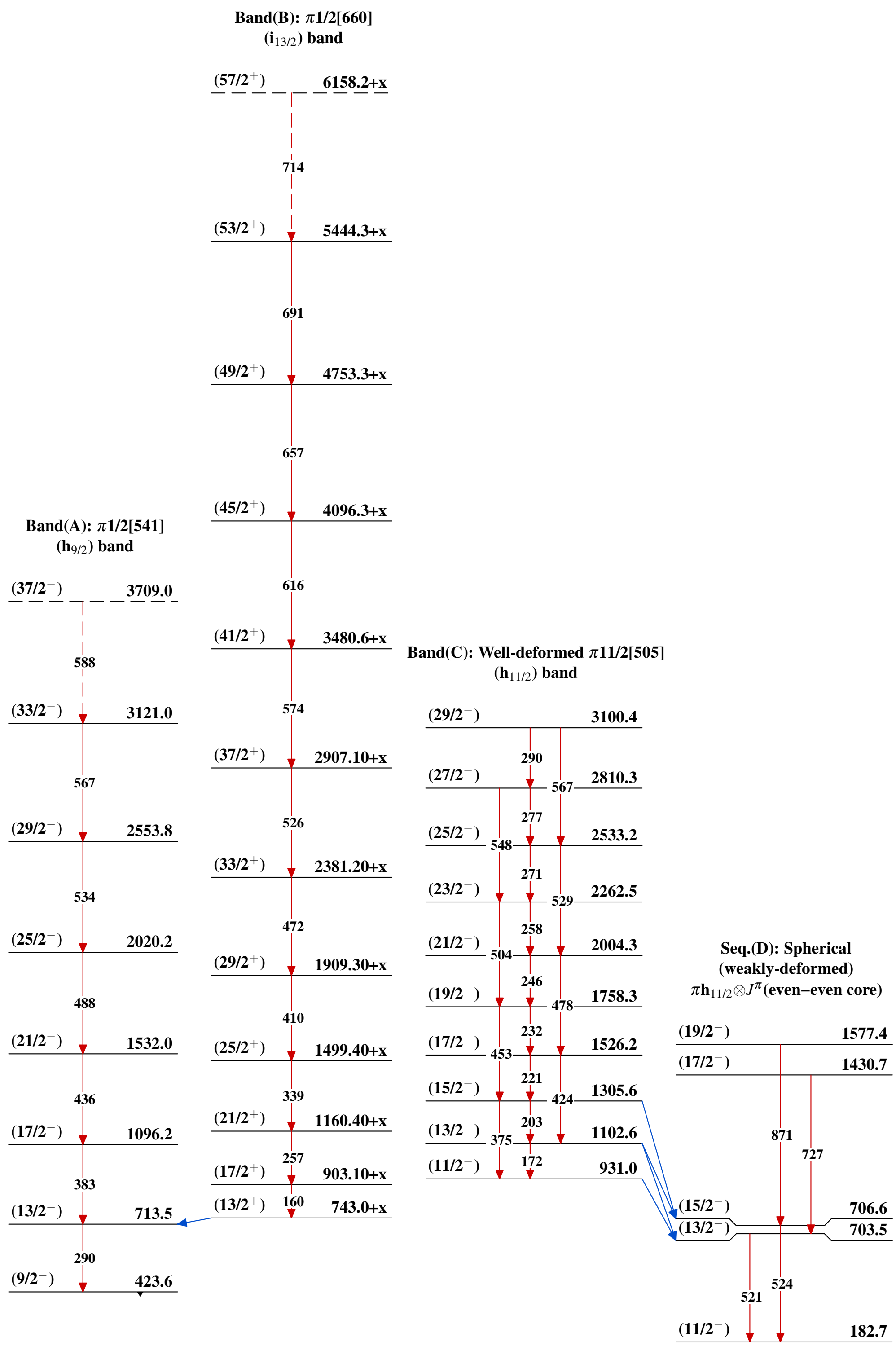
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{177}_{79}Au_{98}$

(HI,xnγ) 2001Ko44,2017Ve03,2014AlZX



$^{177}_{79}Au_{98}$