(HI,xnγ)

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	D. De Frenne	NDS 110, 1745 (2009)	31-Dec-2008

1983Tr01: ^{92}Mo(^{12}C,pn) E=50 MeV, ^{89}Y(^{16}O,3n) E=60-80 MeV, ^{92}Mo(^{14}N,2n2p) E=72 MeV measured: Eγ, Iγ, I$\gamma(\theta)$, pγ, $\gamma\gamma$, γ(t), E(ce), Ice, linear pol. Deduced: ^{102}Ag levels, J, π, α, mult, $T_{1/2}$.

1989Vo13: ^{92}Mo(^{12}C,pn) E=48 MeV. Measured Eγ, $T_{1/2}$. Deduced: ^{102}Ag levels, J^{π}, B(M1). 1992Le10 reanalyzed $T_{1/2}$data of 1990Vo13.

1995Ra13: ^{89}Y(^{16}O,3nγ) E=60-80 MeV. Measured: Eγ, Iγ, $\gamma\gamma$, excit, DCO deduced: ^{102}Ag levels, J,π, mult.

2001Ra29: ^{50}Cr(^{56}Fe,3pn)E=195 MeV. Measured: Eγ, Iγ. γ,γ, Daresbury Recoil Spectrometer. 9 BGO detectors and Compton suppressed Ge detectors; More than 50 unassigned gammas, results considered by the evaluator as unreliable due to several misprints and errors in the paper. The level scheme in this paper is almost entirely taken from 1983Tr01 and 1995Ra13, and therefore only additional information is given here in this data set.

^{102}Ag Levels

Level scheme and band structure taken from 1995Ra13.

E(level)[‡]	J^{π}[#]	$T_{1/2}$[@]	Comments
0.0[b]	5$^+$		J^{π}: J^{π}=3$^+$ from (2001Ra29), probably misprint.
97.3	4$^+$		
141.0[b]	6$^+$	3.5 ns *5*	$T_{1/2}$: from 141γ time correlation spectrum in ^{92}Mo(^{12}C,pn).
181.0[b]	7$^+$		
186.8	(5$^+$)		
336.1	6$^+$		
382.0[a]	7$^+$		
845.6[b]	8$^+$	0.35 ps *13*	
921.7[a]	8$^+$		
1020.1[b]	9$^+$	1.03 ps *9*	
1200.8[a]	9$^+$		
1548.8[&]	8$^-$	154 ps *28*	
1706.2[&]	9$^-$	3.7 ps *12*	
1765.8[b]	(10$^+$)	0.27 ps *9*	
1837.8[a]	(10$^+$)		
1896.0[b]	11$^+$	1.78 ps *67*	
2103.9[&]	10$^-$	0.34 ps *8*	
2117	(9$^-$,10$^-$)	<2.8 ns	J^{π}: J^{π}=9$^-$ favored from DCO, 10$^-$ from systematics. $T_{1/2}$: from time correlation spectrum in ^{92}Mo(^{12}C,pn).
2179?[†]	(10$^-$)		
2203.5			
2377.7[c]	(10$^-$)		J^{π}: J^{π}=10$^-$ suggested from corresponding bandhead state in ^{106}Ag.
2453.4[&]	11$^-$	0.44 ps *10*	
2533?[†]	(11$^-$)		
2614.5[c]	(11$^-$)		J^{π}: J^{π}=11$^-$ suggested from DCO and corresponding states in ^{106}Ag.
2689?[†]			
2847.0[b]	13$^+$		
2889.0[c]	(12$^-$)		J^{π}: J^{π}=12$^-$ suggested from DCO and corresponding states in ^{106}Ag.
2919.8[&]	12$^-$	0.47 ps *7*	$T_{1/2}$: calculated as a weighted average of $T_{1/2}$(466γ)=0.49 ps *11* and $T_{1/2}$(816γ)=0.46 ps

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(HI,xnγ) (continued)

^{102}Ag Levels (continued)

E(level)[‡]	Jπ[#]	$T_{1/2}$[@]	Comments
			9 (1989Vo13) by the evaluators as both γ′s deexcite the same level. Data of different (HI,xnγ) reactions for branching of this level are in mutual disagreement (see 1981Tr01 and 1995Ra13).
2937?[†]	(12⁻)		
3042.6[b]	12⁺		
3157.1[c]	13⁻		Jπ: Jπ=13⁻ suggested from DCO and corresponding states in ^{106}Ag.
3194.5[&]	13⁻	1.50 ps *33*	$T_{1/2}$: the evaluators have correlated the $T_{1/2}$(274.5γ)=1.50 ps *33* with the 3194.5-keV level and not with a 3661.9-keV level as suggested by 1992Le10.
3407.2[&]	13⁻		
3711.7[&]	14⁻		Jπ: from DCO and corresponding states in ^{106}Ag.
4094.5[b]	14⁺		
4178.1[&]	15⁻		
4680.8[&]	16⁻		
4745.5?			
5164.0[&]	17⁻		
5644.1[&]	(18⁻)		
6107.5[&]	(19⁻)		

[†] Only observed by 2001Ra29.
[‡] From a least-squares procedure of observed gammas from (1995Ra13).
[#] From γ(θ), γ lin pol, α, DCO, γγ and band structure.
[@] Unless noted otherwise, from a reanalysis of the results of 1989Vo13 obtained by Doppler-shift attenuation or plunger method (1992Le10).
[&] Member of a ΔJ=1 band based on Jπ=8⁻ level at 1548.8 keV.
[a] Member of a ΔJ=1 band based on Jπ=7⁺ level at 383 keV.
[b] Member of a ΔJ=1 band based on Jπ=5⁺ g.s.
[c] Member of a ΔJ=1 band based on Jπ=(10⁻) level at 2377 keV band$For a different band interpretation see 2001Ra29.

γ(^{102}Ag)

DCO from 1995Ra13.
R(dcom): DCO ratio gating on a known dipole transition in ^{89}Y(^{16}O,3n).
R(DCOQ):DCO ratio gating on a known quadrupole transition in ^{89}Y(^{16}O,3n).
A_{22},A_{44} and Pol from 1983Tr01.
DCO from 1995Ra13.

$E_γ$[†‡@]	E_i(level)	$J^π_i$	E_f	$J^π_f$	Mult.[#]	α[c]	Comments
13.0	2117	(9⁻,10⁻)	2103.9	10⁻			
40.0	181.0	7⁺	141.0	6⁺	M1	5.896	α(K)=5.11; α(L)=0.644; α(M)=0.1226 Mult.: d from A_{22}, A_{44} and M1 from observed band structure. A_{22}=−0.33 *9* A_{44}=−0.01 *10*. δ: Other: δ≥−0.14 or≤0.18 (1983Tr01).
45.9	382.0	7⁺	336.1	6⁺	M1	3.942	α(K)=3.416; α(L)=0.4294; α(M)=0.082 A_{22}=−0.33 *9* A_{44}=−0.02 *10*. δ: Other: δ≥−0.14 or≤−0.7 (1983Tr01).

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(HI,xnγ) (continued)

γ(^{102}Ag) (continued)

E_γ †‡@	I_γ †‡	E_i(level)	J^π_i	E_f	J^π_f	Mult.#	δ#	α c	Comments
x76.3 3	6 2								
89.8	13	186.8	(5+)	97.3	4+	M1		0.5686	R(dcom)=1.26 20. Mult.: from R(DCO) in ^{89}Y(^{16}O,3n). A_{22}=−0.09 3 \$$A_{44}$=−0.10 4. δ: Other: δ≥−1.7 or≤−0.7 (1983Tr01).
97.3	15	97.3	4+	0.0	5+	M1			A_{22}=−0.15 7\$$A_{44}$=−0.08 8. R(dcom)=1.12 14.
x108.1 4	3 2								
x116.0 4	5 3								
130.2		1896.0	11+	1765.8	(10+)				
141.0	100	141.0	6+	0.0	5+	M1+E2	0.8 3	0.2929	ce(K)=0.241; ce(L)=0.042 α(K)exp=0.24 7 α(L)exp=0.043 11 R(dcom)=0.58 2. R(DCOQ)=0.91 11. A_{22}=+0.54 3 \$$A_{44}$=+0.07 4 \$Pol=−0.52 9. δ: Other: δ≥−1.7 or≤−0.7 (1983Tr01).
149.1	18	336.1	6+	186.8	(5+)	M1		0.1383	α(K)exp=0.100 27 R(dcom)=0.98 10. R(DCOQ)=2.04 24. Mult.: from α(K)exp and R(DCO) in ^{89}Y(^{16}O,3n). A_{22}=−0.10 5 \$$A_{44}$=−0.04 6 \$Pol=−0.17 21. δ: Other: δ =0≈(1983Tr01).
157.4	26	1706.2	9−	1548.8	8−	M1+(E2)	<0.2	<0.1258	A_{22}=−0.09 4 \$$A_{44}$=−0.06 5 \$Pol=−0.52 9. R(dcom)=1.09 5.
x167.5 4	5 4								
174.5	13	1020.1	9+	845.6	8+	M1+E2	+0.14 22	0.09132	R(dcom)=1.58 27. R(DCOQ)=1.35 22. A_{22}=−0.24 10 \$$A_{44}$=−0.03 13 \$Pol=−0.94 12. δ: Other: δ≥−0.08 or≤+0.360.7 (1983Tr01).
x180.8 4	7 4								
187.1	4	186.8	(5+)	0.0	5+	M1		0.0748	R(dcom)=0.95 16. R(DCOQ)=1.3 22.
196.0	46	3042.6	12+	2847.0	13+	E2		0.1327	R(DCOQ)=0.99 10.
x214.2 4	7 3								
x229.0 4	5 2								
236.8	12	2614.5	(11−)	2377.7	(10−)	M1		0.04007	R(dcom)=0.95 9.
x240.5 3	24 6								
260.8	93	2377.7	(10−)	2117	(9−,10−)	M1		0.0315	R(dcom)=1.03 13. R(DCOQ)=1.92 25.
x262.3 3	25 7								
268.1	15	3157.1	13−	2889.0	(12−)	(M1+E2)		0.032	R(dcom)=1.96 76.
274.5		2889.0	(12−)	2614.5	(11−)	M1		0.0273	R(dcom)=1.06 10. R(DCOQ)=1.72 21. A_{22}=−0.12 3 \$$A_{44}$=−0.01 4 \$Pol=−0.28 5. Mult.: Other: M1,E2 (1983Tr01).

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(HI,xnγ) (continued)

$\gamma(^{102}Ag)$ (continued)

E_γ[†‡@]	I_γ[†‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[c]	Comments
274.5	37	3194.5	13^-	2919.8	12^-	M1	0.0273	R(dcom)=1.06 *10*. R(DCOQ)=1.72 *10*. A_{22}=−0.12 *5*\$$A_{44}$=−0.01 *4* \$Pol=−0.28 *5*.
279.5	101	1200.8	9^+	921.7	8^+	M1	0.0261	R(dcom)=1.26 *20*. A_{22}=−0.24 *4* \$$A_{44}$=−0.03 *4* \$Pol=−0.29 *7*. δ: Other: δ≥−0.08or≤+0.08 (1983Tr01).
[x]284.0 *5*	7 *3*							
304.5	12	3711.7	14^-	3407.2	13^-	M1	0.02091	R(dcom)=1.08 *10*. R(DCOQ)=1.92 *44*.
[x]309.8 *4*	12 *4*							
[x]329.0 *4*	[a]							
336.1	72	336.1	6^+	0.0	5^+	M1	0.01627	α(K)exp=0.014 *4* R(dcom)=1.12 *14*. R(DCOQ)=1.61 *21*. Mult.: from α(K)exp and R(DCO) in $^{89}Y(^{16}O,3n)$. A_{22}=−0.25 *3* \$$A_{44}$=−0.04 *3*. Mult.: Other: M1(+E2) (1983Tr01).
349.5	41	2453.4	11^-	2103.9	10^-	M1	0.01474	α(K)=0.01286 α(K)exp=0.015 *4* R(dcom)=1.08 *4*. R(DCOQ)=2.38 *45*. A_{22}=−0.18 *4* \$$A_{44}$=−0.07 *4* \$Pol=−0.29 *6*. δ: Other: δ≥−0.08 or≤−0.08 (1983Tr01).
354.2[bd]	2	2533?	(11^-)	2179?	(10^-)			
397.7	53	2103.9	10^-	1706.2	9^-	M1	0.0107	α(K)=0.00932 α(K)exp=0.008 *2* R(dcom)=0.98 *4*. A_{22}=−0.09 *4*\$$A_{44}$=−0.03 *3* \$Pol=−0.32 *4*. δ: Other: δ≥0 or≤+0.12 (1983Tr01).
403.7[bd] *2*		2937?	(12^-)	2533?	(11^-)			
[x]415.1 *3*	8 *4*							
[x]420.5 *4*	[&]							
[x]428.8 *2*	6 *3*							
[x]452.0 *5*	6 *4*							
463		6107.5	(19^-)	5644.1	(18^-)			R(dcom)=0.31 *4*. R(DCOQ)=0.68 *22*.
463.4		845.6	8^+	382.0	7^+	M1		R(dcom)=0.31 *4*. R(DCOQ)=0.68 *22*. A_{22}=−0.22 *4* \$$A_{44}$=−0.03 *5* \$Pol=−0.33 *10*. δ: Other: δ≥−0.08 or≤+0.08 (1983Tr01).
466.4		4178.1	15^-	3711.7	14^-	M1		R(dcom)=1.19 *5*. R(DCOQ)=2.70 *29*. A_{22}=−0.24 *3*\$$A_{44}$=−0.02 *3* \$Pol=−0.32 *5*. Pol is for unresolved multiplet.
466.6	42	2919.8	12^-	2453.4	11^-	M1		R(dcom)=1.19 *5*. R(DCOQ)=2.70 *29*. A_{22}=−0.24 *3* \$$A_{44}$=−0.02 *3* \$Pol=−0.32 *5*. A_{22} and $A_{44}$for unresolved doublet.
473.2[bd] *2*		2179?	(10^-)	1706.2	9^-			
480		5644.1	(18^-)	5164.0	17^-	(M1+E2)		R(dcom)=0.37 *6*. E_γ: member of doublet together with 483.2γ. Mult.: No δ given in (HI,xnγ).
483.2	12	5164.0	17^-	4680.8	16^-	(M1+E2)		R(dcom)=2.12 *13*. E_γ: member of doublet together with 480.1γ. Mult.: No δ given in (HI,xnγ).

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(HI,xnγ) (continued)

γ(^{102}Ag) (continued)

E_γ [†‡@]	I_γ [†‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ[#]	α[c]	Comments
487.2	6	3407.2	13⁻	2919.8	12⁻	M1			R(dcom)=1.15 *5*.
[x]489.3 *3*	35 *9*								
[x]494.9 *4*	9 *4*								
502.7	31	4680.8	16⁻	4178.1	15⁻				R(dcom)=1.17 *5*.
510.3[bd]	2	2689?		2179?	(10⁻)				
517.2	27	3711.7	14⁻	3194.5	13⁻	M1			
[x]524.8 *3*	12 *5*								
[x]529.4 *3*	30 *7*								
540.3	37	921.7	8⁺	382.0	7⁺	(M1+E2)			R(dcom)=0.92 *16*. A_{22}=−0.10 *3* \$$A_{44}$=−0.05 *4* \$Pol=−0.06 *4*. Mult.: No δ given in (HI,xnγ).
[x]548.0 *2*	12 *4*								
554.8	487	3711.7	14⁻	3157.1	13⁻				R(dcom)=1.01 *7*. E_γ: Iγ is not reliable because 554.8 is a member of a complex multiplet together with 555.1γ and ^{101,102}Pd impurities of almost the same energy.
555.1	487	2103.9	10⁻	1548.8	8⁻				Observed in ^{89}Y(^{16}O,3n) as an unresolved multiplet also containing impurities due to ^{101}Pd and ^{102}Pd.
[x]577.8 *3*	[&]								
[x]617.6 *3*	8 *4*								
[x]626.4 *3*	6 *3*								
638.0		1837.8	(10⁺)	1200.8	9⁺	D			R(dcom)=1.37 *35*. Mult.: from R(DCO) in ^{89}Y(^{16}O,3n) and \$$A_{22}$=−0.23 *7* \$$A_{44}$=−0.02 *8*.
[x]646.7 *3*	23 *7*								
651.0[d]	13	4745.5?		4094.5	14⁺				I_γ: Iγ sum of 651.0γ of ^{102}Ag and 653γ from ^{101}Ag and ^{102}Rh.
[x]656.0 *3*	18 *6*								
664.6	37	845.6	8⁺	181.0	7⁺	M1+E2	−0.81 *89*	0.0299	R(dcom)=0.59 *5*. A_{22}=+0.55 *5* \$$A_{44}$=−0.04 *6* \$Pol=−0.52 *9*. δ: Other: δ≥−1.7 or≤+0.08 (1983Tr01).
[x]673.5 *2*	25 *7*								
686.2	24	1706.2	9⁻	1020.1	9⁺	(E1)			R(dcom)=0.64 *10*.
[x]695.9 *3*	8 *3*								
702.7	73	1548.8	8⁻	845.6	8⁺	E1			R(dcom)=1.04 *8*. A_{22}=+0.20 *4*\$$A_{44}$=−0.11 *6*.
[x]714.9 *3*	5 *3*								
[x]721.8 *3*	5 *3*								
742.0[d] *3*		2919.8	12⁻	2179?	(10⁻)				E_γ: Only observed by 2001Ra29.
745.7	33	1765.8	(10⁺)	1020.1	9⁺	(M1+E2)			R(DCOQ)=1.51 *40*. Mult.: from R(DCO) in ^{89}Y(^{16}O,3n) and \$$A_{22}$=+0.14 *10* \$$A_{44}$=+0.02 *7*.
747.3	90	2453.4	11⁻	1706.2	9⁻	E2			A_{22}=+0.27 *5* \$$A_{44}$=−0.18 *5*. R(dcom)=0.58 *70*.
[x]758.0 *3*	9 *4*								
[x]776.0 *3*	[a]								
[x]788.8 *3*	8 *4*								
816.2		2919.8	12⁻	2103.9	10⁻	E2			R(DCOQ)=0.95 *8*. A_{22}=+0.10 *4*\$$A_{44}$=+0.01 *5* \$Pol=+0.43 *4*.
819.8	20	1200.8	9⁺	382.0	7⁺	E2			R(dcom)=0.42 *7*.

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(HI,xnγ) (continued)

γ(^{102}Ag) (continued)

E_γ [†‡@]	I_γ [†‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	Comments
[x]831.2 *3*	14 *5*						
839.1	97	1020.1	9$^+$	181.0	7$^+$	E2	R(DCOQ)=0.95 *8*. A_{22}=+0.25 *2* A_{44}=−0.10 *3* $Pol=+0.38 *3*.
[x]851.4 *2*	105 *12*						
860.6	155	1706.2	9$^-$	845.6	8$^+$	(E1)	R(dcom)=1.06 *10*. R(DCOQ)=2.50 *40*. Mult.: d from R(DCO) in ^{89}Y(^{16}O,3n) and (E2) from A_{22}=+0.25 *2* A_{44}=−0.12 *3* $Pol=+0.36 *5* (1983Tr01) From observed band structure E1 is most likely.
875.9	54	1896.0	11$^+$	1020.1	9$^+$	E2	R(DCOQ)=1.00 *7*. A_{22}=+0.37 *3* A_{44}=−0.11 *3* $Pol=+0.48 *10*.
[x]888.5 *2*	61 *10*						
[x]920.9 *3*	[&]						
951.0	29	2847.0	13$^+$	1896.0	11$^+$	E2	R(DCOQ)=1.37 *20*. A_{22}=+0.27 *13* A_{44}=−0.12 *3* $Pol=+0.36 *10*.
954.0	2	3407.2	13$^-$	2453.4	11$^-$		
[x]967.0 *3*	[a]						
[x]985.2 *3*	[a]						
[x]998.3 *3*	[&]						
[x]1043.9 *4*	7 *4*						
[x]1052.5 *4*	7 *4*						
[x]1076.9 *4*	6 *4*						
1084.0	23	2103.9	10$^-$	1020.1	9$^+$	E1	R(dcom)=0.94 *26*.
[x]1087.4 *4*	[&]						
[x]1103.9 *4*	9 *4*						
[x]1120.4 *2*	9 *4*						
1147.0	22	3042.6	12$^+$	1896.0	11$^+$	M1	R(dcom)=0.99 *34*.
[x]1164.9 *4*	[a]						
[x]1183.1 *4*	8 *4*						
1183.4		2203.5		1020.1	9$^+$		E_γ: From 1983Tr01, not observed by 1995Ra13 in ^{89}Y(^{16}O,3n).
[x]1185.0 *4*	7 *4*						
[x]1196.4 *4*	[&]						
1247.5	16	4094.5	14$^+$	2847.0	13$^+$	M1	R(DCOQ)=2.22 *44*.
[x]1264.3 *2*	4 *3*						
[x]1291.5 *3*	7 *3*						
[x]1320.9 *3*	10 *4*						
[x]1356.6 *3*	6 *3*						
[x]1365.2 *3*	28 *6*						
1367.8	224	1548.8	8$^-$	181.0	7$^+$	E1	A_{22}=−0.30 *3* A_{44}=−0.02 *3* $Pol=+0.33 *9*. R(dcom)=1.07 *13*. δ: δ≥0 or≤+0.05 (1983Tr01).
[x]1387.4 *2*	25 *7*						
[x]1417.0 *3*	5 *4*						
[x]1427.4 *2*	7 *4*						
[x]1446.0 *3*	[&]						
[x]1483.5 *5*	[&]						
[x]1501.2 *5*	[&]						
[x]2287.4 *3*	5 *3*						
[x]2298.6 *3*	6 *3*						
[x]2336.9 *3*	[&]						

† From ^{89}Y(^{16}O,3nγ) at 99°(1995Ra13) No uncertainties given by the authors.

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(HI,xnγ) (continued)

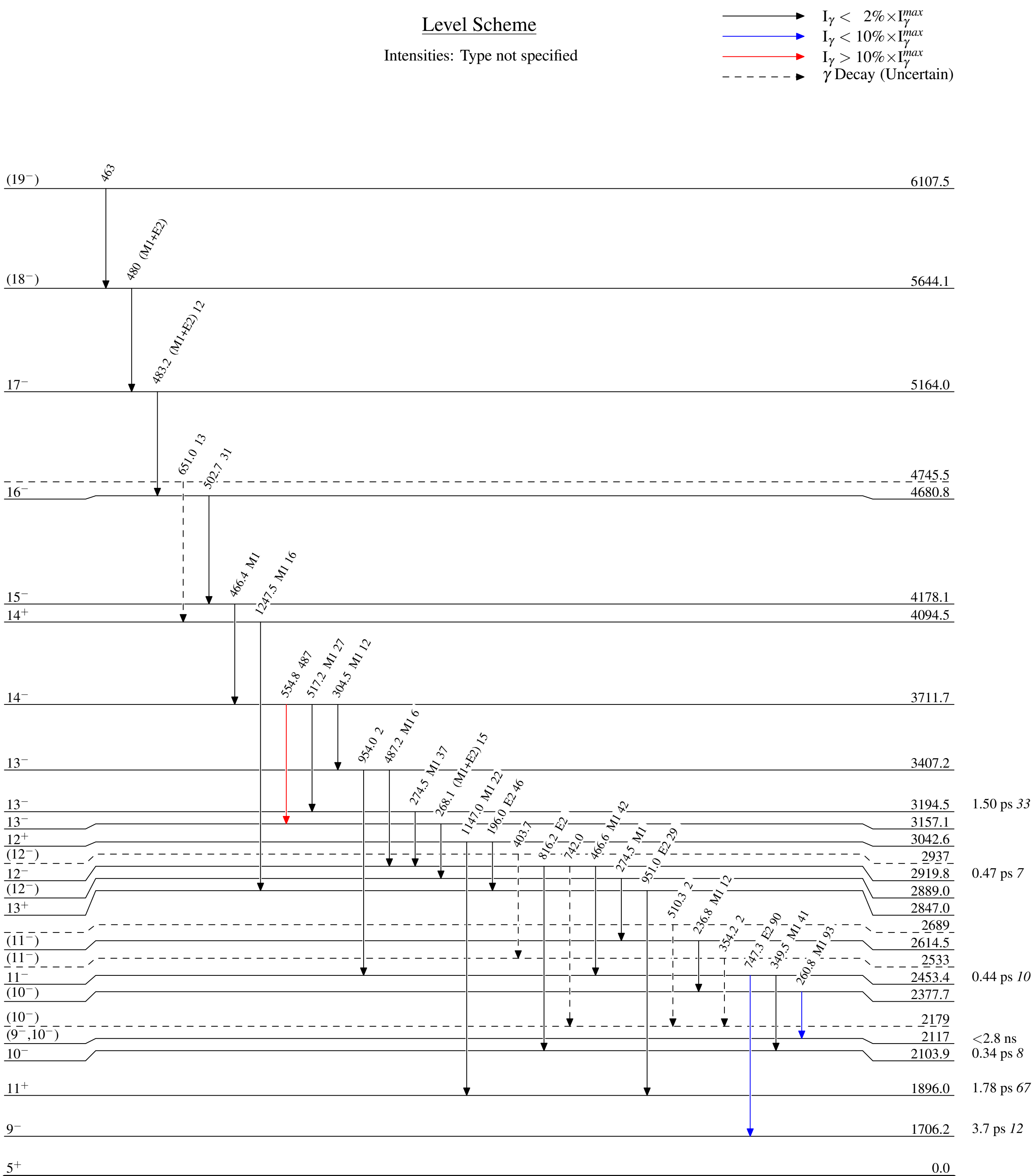
$\gamma(^{102}Ag)$ (continued)

‡ For values from $^{92}Mo(^{12}C,pn)$ E=50 MeV, $^{89}Y(^{16}O,3n)$ E=60-80 MeV, $^{92}Mo(^{14}N,2n2p)$ E=72 MeV see 1983Tr01.
# Unless noted otherwise, from $\gamma(\theta)$, γ lin pol, α. It is assumed by 1995Ra13 that stretched quadrupole transitions are E2 and intraband dipole transitions M1.For several mixed transitions no δ given.
@ All unassigned gamma rays are from 2001Ra29.
& Intensity given as "weak" in 2001Ra29.
[a] The γ-ray listed as doublet in 2001Ra29.
[b] Only observed by 2001Ra29.
[c] 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.
[d] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

(HI,xnγ)

Level Scheme

Intensities: Type not specified



$^{102}_{47}Ag_{55}$

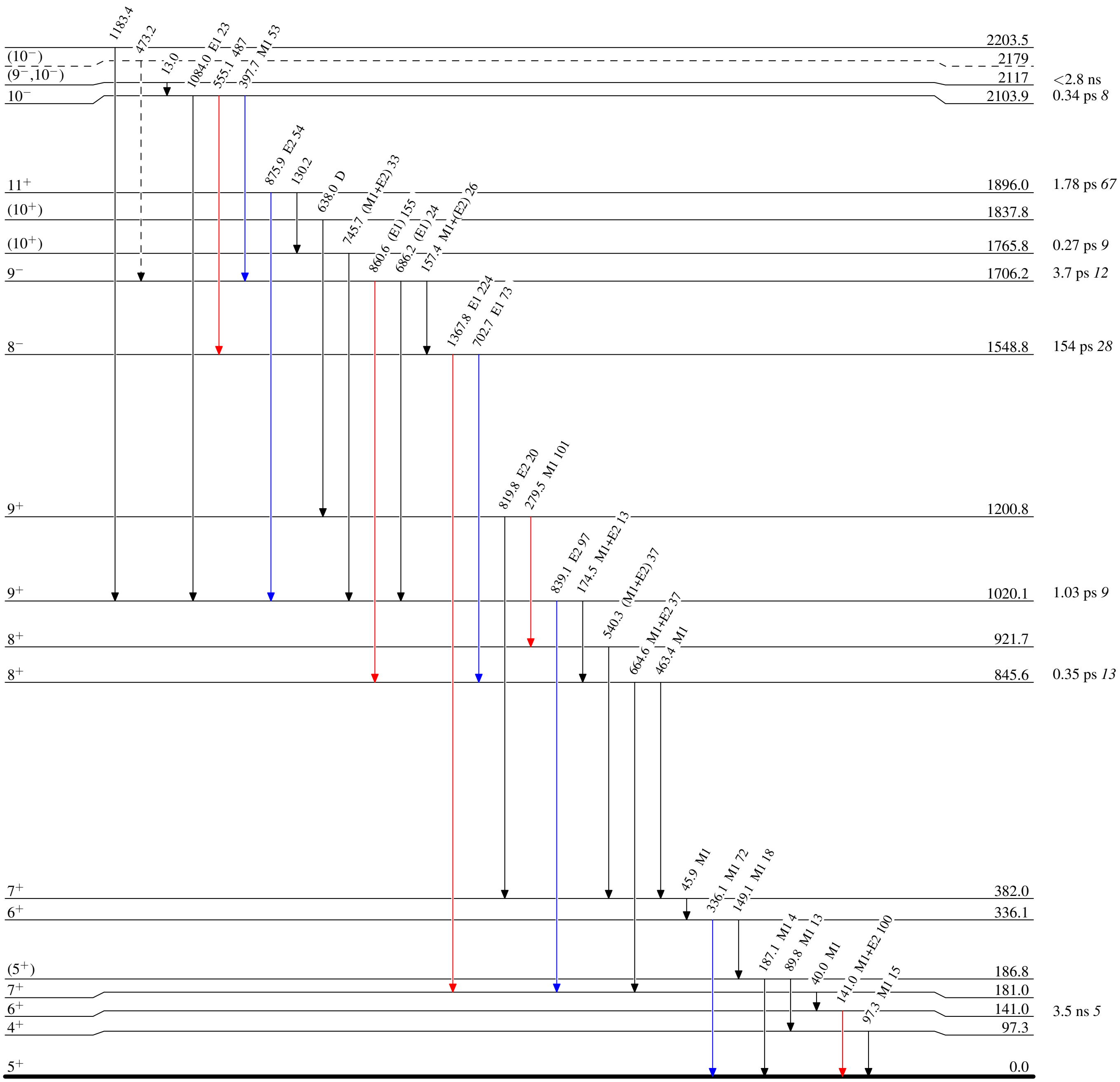
(HI,xnγ)

Level Scheme (continued)

Intensities: Type not specified

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)



$^{102}_{47}Ag_{55}$