^{123}Ag IT decay (393 ns) 2013La11,2009St28,2006ToZW

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 174, 1 (2021)	15-Apr-2021

Parent: ^{123}Ag: E=1473.5 *5*; J^{π}=(17/2$^-$); $T_{1/2}$=393 ns *16*; %IT decay=100.0

2013La11: neutron-rich Ag nuclei were produced in two experiments performed at GSI, using the fragmentation of a ^{136}Xe beam and the fission of a ^{238}U beam, both with E=750 MeV/nucleon from the SIS-18 synchrotron, on Be targets of 1 and 4 g/cm^2 thickness, respectively. Fragments were analyzed and separated by the GSI Fragment Separator (FRS) and implanted into a copper or plastic stopper. Delayed γ rays were detected with the RISING array consisting of 105 HPGe detectors mounted as 15 clusters. Measured Eγ, Iγ, $\gamma\gamma$-coin, γ(t). Deduced levels, J, π, $T_{1/2}$. Comparisons with shell-model calculations.

2009St28 (also 2007To23, 2006ToZW, 2005WaZY): neutron-rich Ag nuclei were produced via fragmentation of E=120 MeV/nucleon ^{136}Xe beam from the cyclotron at NSCL on a 188 mg/cm^2 Be target. Fragments were separated by the A1900 separator and implanted into the NSCL Beta Counting System (BCS) consisting of three Si PIN detectors, a double- sided and six single-sided Si detectors for particle identification. γ rays were detected with 12 segmented Ge detectors from the NSCL SeGA array. Measured Eγ, Iγ, fragment-γ-coin, $\gamma\gamma$-coin, γ(t). Deduced levels, J, π, $T_{1/2}$. Systematics of neighboring Ag isotopes.

Level scheme, initially proposed by 2006ToZW was revised by 2009St28. Later work by 2013La11 is more in agreement with the results from 2006ToZW than from 2009St28. Data and level scheme in 2013La11 are adopted here.

^{123}Ag Levels

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	Comments
0.0	(7/2$^+$)		
26.9 *4*	(9/2$^+$)		
656.7 *5*	(11/2$^+$)	<25 ns	J^{π}: (13/2$^+$) suggested by 2009St28, (11/2$^+$) in 2006ToZW.
740.8 *4*	(13/2$^+$)	<25 ns	
1076.5 *3*	(9/2$^-$,11/2$^+$)		J^{π}: (11/2$^+$) suggested by 2009St28 and 2006ToZW.
1426.2 *4*	(13/2$^-$)		J^{π}: (15/2$^+$,13/2$^-$) suggested by 2009St28; (15/2$^+$) in 2006ToZW.
1473.5 *5*	(17/2$^-$)	393 ns *16*	$T_{1/2}$: from γ(t), weighted average of 393 ns *16* (2013La11) and 396 ns *37* (2009St28). Other: 0.32 μs *3* (2006ToZW).

[†] From a least-squares fit to γ-ray energies.

[‡] For excited states, tentative assignment are from 2013La11, based on systematics and observed decay pattern.

[#] From γ(t) (2013La11).

$\gamma(^{123}Ag)$

Iγ normalization: From Iγ(all γ from 1426 level+732.7γ from 1474 level)=100.

E_γ [†]	I_γ [†#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α [@]	$I_{(\gamma+ce)}$ [#]	Comments
(27)		26.9	$(9/2^+)$	0.0	$(7/2^+)$				E_γ: not observed experimentally in 2013La11.
(48)	7.2 *2*	1473.5	$(17/2^-)$	1426.2	$(13/2^-)$	[E2]	19.9	151 *4*	B(E2)(W.u.)=6.8 *8* (2013La11) $I_{(\gamma+ce)}$: deduced by evaluator from γ+ce intensity balance at 1426 level, with negligible contributions from internal conversion of γ rays de-exciting 1426 level. I_γ: γ not observed experimentally, Iγ deduced from the intensity balance at the 1426-keV level, and conversion coefficient=19.9.
84[‡] *1*	10 *5*	740.8	$(13/2^+)$	656.7	$(11/2^+)$				
335.2[‡] *5*	3.6 *7*	1076.5	$(9/2^-,11/2^+)$	740.8	$(13/2^+)$				
349.5 *2*	38.6 *21*	1426.2	$(13/2^-)$	1076.5	$(9/2^-,11/2^+)$				E_γ: weighted average of 348.7 *5* (2013La11) and 349.5 *1* (2006ToZW). Other: 351.4 *1* (2009St28). I_γ: unweighted average of 42.8 *14* (2013La11), 36 *3* (2009St28), and 37 *2* (2006ToZW).
629.6 *5*	33.2 *15*	656.7	$(11/2^+)$	26.9	$(9/2^+)$				E_γ: unweighted average of 629.1 *5* (2013La11) and 630.1 *1* (2006ToZW). Other: 632.9 *1* (2009St28). I_γ: weighted average of 32.7 *15* (2013La11), 37 *4* (2009St28), and 33 *3* (2006ToZW).
685.6 *2*	83.4 *23*	1426.2	$(13/2^-)$	740.8	$(13/2^+)$				E_γ: weighted average of 684.7 *5* (2013La11) and 685.6 *1* (2006ToZW). Other: 687.3 *1* placed from 714 level (2009St28). I_γ: weighted average of 84.5 *23* (2013La11), 78 *6* (2009St28), and 80 *7* (2006ToZW).
714.0 *2*	100	740.8	$(13/2^+)$	26.9	$(9/2^+)$				E_γ: weighted average of 713.2 *5* (2013La11) and 714.0 *1* (2006ToZW). Other: 716.7 *2* and 714 with combined Iγ=100 *7* in 2009St28. Doublet at 713 keV was not confirmed by 2013La11, who place the 713γ above the 27 level, whereas 2009St28 placed a 714γ as a ground-state transition, and 717γ from a 1430 level. I_γ: other: 100 *4* in 2006ToZW.
732.7 *3*	10 *3*	1473.5	$(17/2^-)$	740.8	$(13/2^+)$	[M2]	0.0068		E_γ: weighted average of 732.1 *5* (2013La11) and 732.9 *3* (2006ToZW). Other: 735.1 *3* unplaced in 2009St28. I_γ: unweighted average of 15.4 *11* (2013La11), 8 *2* (2009St28), and 6 *3* (2006ToZW).
[x]741.2 *5*	4.3 *7*								Eγ=738.3 *4*, Iγ=7 *1*, unplaced in 2009St28.
769.3 *5*	28.5 *15*	1426.2	$(13/2^-)$	656.7	$(11/2^+)$				E_γ: unweighted average of 768.8 *5* (2013La11) and 769.8 *1* (2006ToZW). Other: 771.6 *4* (2009St28). I_γ: weighted average of 29.5 *15* (2013La11), 31 *4* (2009St28), and 26 *2* (2006ToZW).

$^{123}_{47}Ag_{76}$-2

^{123}Ag IT decay (393 ns) 2013La11,2009St28,2006ToZW (continued)

γ(^{123}Ag) (continued)

E_γ [†]	I_γ [†#]	E_i(level)	J_i^π	E_f	J_f^π	Comments
[x]1008.2[‡] *5*	1.7 *4*					
1049.3 *5*	9.8 *15*	1076.5	(9/2$^-$,11/2$^+$)	26.9	(9/2$^+$)	E_γ: others: 1049.3 *6* (2006ToZW), 1052.1 *5* (2009St28). I_γ: weighted average of 9.1 *9* (2013La11), 17 *3* (2009St28), and 11 *5* (2006ToZW).
1076.5 *3*	19.4 *13*	1076.5	(9/2$^-$,11/2$^+$)	0.0	(7/2$^+$)	E_γ: weighted average of 1076.3 *5* (2013La11) and 1076.6 *3* (2006ToZW). Other: 1079.4 *5* (2009St28). I_γ: weighted average of 19.5 *13* (2013La11), 22 *3* (2009St28), and 16 *3* (2006ToZW).
[x]1133.5 *2*	5 *1*					E_γ: γ from 2006ToZW, 2007To23 only.

[†] From 2013La11, unless otherwise noted. Some of the Eγ values given in 2006ToZW are more precise than in 2013La11, but these are in disagreement with the values in 2009St28 from the same lab. The energies of all the gamma rays in 2009St28 are systematically higher by ≈2-4 keV than those in 2013La11 and 2006ToZW (also 2007To23) and are not considered in average.

[‡] Weak γ from 2013La11 only.

[#] For absolute intensity per 100 decays, multiply by 0.62 *2*.

[@] 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.

[x] γ ray not placed in level scheme.

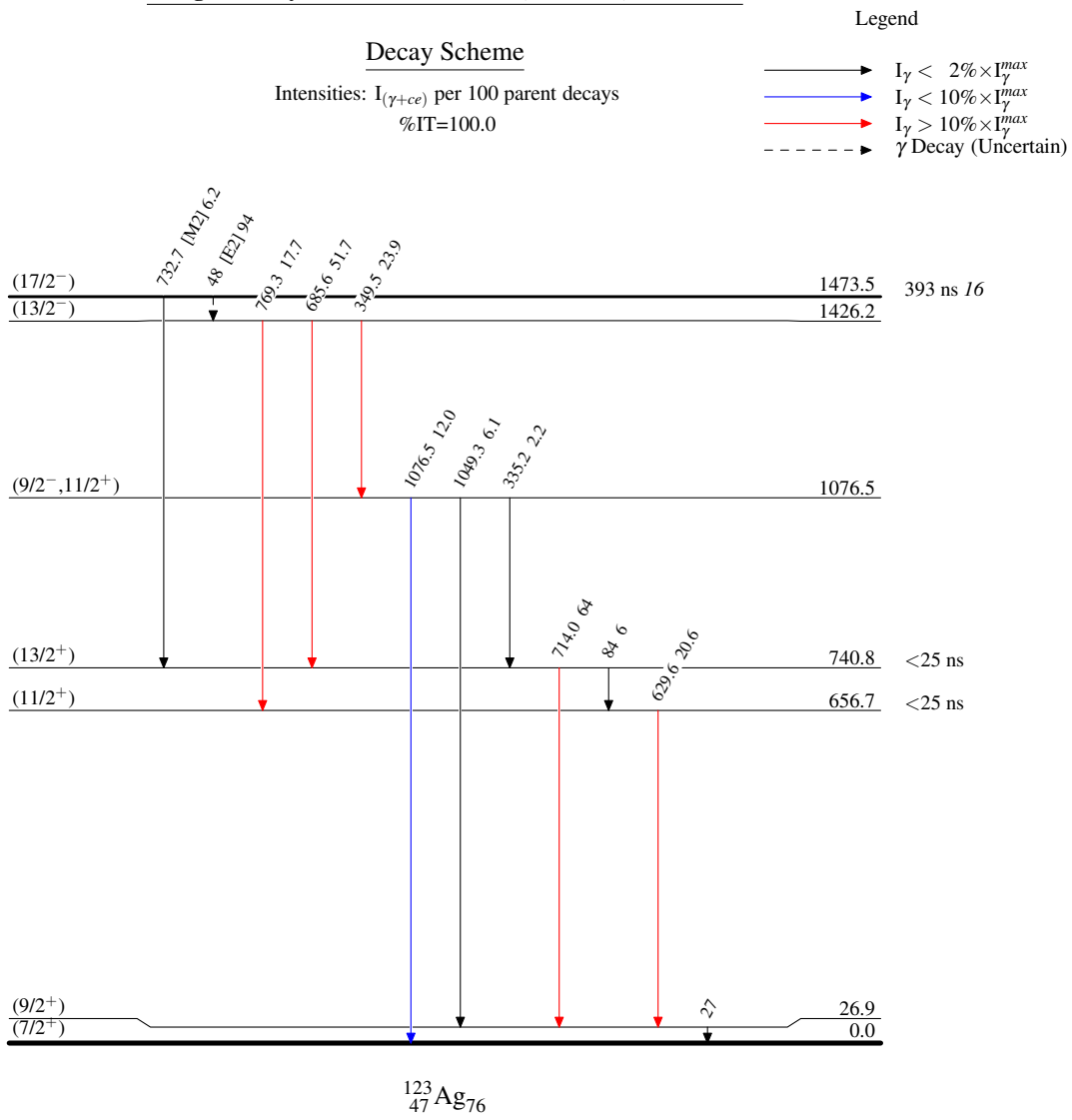
$^{123}_{47}Ag_{76}$-3

^{123}Ag IT decay (393 ns) 2013La11,2009St28,2006ToZW

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

%IT=100.0



$^{123}_{47}Ag_{76}$