^{123}La ε decay 1991Ii02

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

Parent: ^{123}La: E=0.0; $T_{1/2}$=16.3 s *3*; Q(ε)=7000 *SY*; %ε+%$β^+$ decay=100.0

^{123}La-$T_{1/2}$: weighted average of 16.3 s *3* (1992Ic02, γ(t)), 16 s *1* (1988GeZR, γ(t)), and 17 s *3* (1978Bo32, x-ray(t)); adopted in Adopted Levels of ^{123}La.

^{123}La-Q(ε): From 2021Wa16 with ΔQ(ε)=200 (syst).

1991Ii02: ^{123}La source was produced via ^{92}Mo(^{35}Cl,2p2n) reaction with E=180 MeV ^{35}Cl beam from the tandem accelerator facility in the Japan Atomic Energy Research Institute. Reaction products were mass-separated and implanted into an aluminum-coated Mylar tape. γ rays were detected with HPGe detectors and electrons were detected with Si(Li) detectors and a plastic scintillator. Measured Eγ, Iγ, E(ce), I(ce), γγ-coin, βγ-coin, βγ(t). Deduced levels, J, π, band structures, $T_{1/2}$, conversion coefficients, γ- ray multipolarities.

1978Bo32: ^{123}La source was produced via ^{96,98}Ru(^{32}S,xnyp) reaction with E=190 MeV ^{32}S beam from the U-300 heavy-ion cyclotron of the JINR Laboratory of Nuclear Reactions at Dubna. Reaction products were separated using the on-line BEMS-2 facility. γ and x rays were detected with a high-resolution Ge(Li) spectrometer and electrons were detected with a plastic β-counter. Measured Eγ, Iγ, E(x ray), I(x ray), (x ray)β-coin.

Other: 1992Ic02, 1988GeZR.

The decay scheme is as proposed by 1991Ii02 on the basis of energy sums and γγ-coin. The decay scheme is considered incomplete since intensity imbalances suggest significant unobserved feedings to both the proposed 120.9, $1/2^+$ level and the 92.5, $7/2^-$ level.

^{123}Ba Levels

E(level)†	Jπ‡	$T_{1/2}$	Comments
0.0	$5/2^{(+)}$	2.4 min *4*	$T_{1/2}$: from Adopted Levels.
92.5 *3*	$(7/2^-)$		
120.95# *23*	$(1/2^+)$	0.83 μs *6*	$T_{1/2}$: from βγ(t) in 1991Ii02.
153.61# *21*	$(3/2^+)$		
169.01 *17*	$(7/2^+)$		
202.3 *4*	$(9/2^-)$		
328.00# *18*	$(5/2^+)$		
335.5 *4*	$(11/2^-)$		
374.22 *22*	$(9/2^+)$		
397.49# *21*	$(7/2^+)$		
460.7 *5*			Jπ: $(9/2^+)$ proposed in 1991Ii02.
482.30 *23*			
564.3 *4*			
582.3 *4*	$(13/2^-)$		
612.6 *3*	$(11/2^+)$		
695.27# *23*	$(9/2^+)$		
721.2 *4*	$(7/2^-,9/2,11/2^-)$		
790.9# *4*	$(11/2^+)$		
799.2 *4*			
1091.0 *3*			

† From a least-squares fit to γ-ray energies.
‡ From Adopted Levels.
# Band(A): 1/2[411] band (1991Ii02).

^{123}La ε decay 1991Ii02 (continued)

γ(^{123}Ba)

E_γ[‡]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	α[†]	Comments
69.5 *3*	4.9 *5*	397.49	(7/2$^+$)	328.00	(5/2$^+$)			
92.5 *3*	230 *23*	92.5	(7/2$^-$)	0.0	5/2$^{(+)}$	(E1)	0.282 *5*	α(K)=0.241 *4*; α(L)=0.0330 *6*; α(M)=0.00676 *12* α(N)=0.001434 *24*; α(O)=0.000210 *4*; α(P)=1.239×10^{-5} *21* E_γ: other: 93 *1* from 1978Bo32. Iγ(92.5γ)/I(K x-ray)=0.25 *5* (1978Bo32).
109.8 *3*	71 *7*	202.3	(9/2$^-$)	92.5	(7/2$^-$)	(D+Q)		
120.9 *3*	72	120.95	(1/2$^+$)	0.0	5/2$^{(+)}$	(E2)	0.984 *17*	α(K)=0.674 *11*; α(L)=0.244 *5*; α(M)=0.0531 *10* α(N)=0.01106 *20*; α(O)=0.00148 *3*; α(P)=3.23×10^{-5} *5* Mult.: E2 or M1+E2 from α_K(exp); M1 mixing was estimated to be 0 or very small on the basis of Weisskopt hindrance factor for the measured $T_{1/2}$ (1991Ii02).
133.2 *3*	16 *2*	335.5	(11/2$^-$)	202.3	(9/2$^-$)	(D+Q)		
153.6 *3*	100 *10*	153.61	(3/2$^+$)	0.0	5/2$^{(+)}$	M1		Mult.: M1,E2 from α_K(exp).
159.0 *3*	3.1 *3*	328.00	(5/2$^+$)	169.01	(7/2$^+$)			
169.0 *3*	59	169.01	(7/2$^+$)	0.0	5/2$^{(+)}$	(M1)		
174.4 *3*	26 *3*	328.00	(5/2$^+$)	153.61	(3/2$^+$)	M1,E2		Mult.: from α_K(exp).
205.2 *3*	13 *1*	374.22	(9/2$^+$)	169.01	(7/2$^+$)	(D+Q)		
207.0 *3*	16 *2*	328.00	(5/2$^+$)	120.95	(1/2$^+$)	Q		
228.5 *3*	4.2 *4*	397.49	(7/2$^+$)	169.01	(7/2$^+$)			
238.4 *3*	2.5 *3*	612.6	(11/2$^+$)	374.22	(9/2$^+$)	(D+Q)		
243.1 *3*	5.1 *5*	335.5	(11/2$^-$)	92.5	(7/2$^-$)	Q		
243.9 *3*	66 *7*	397.49	(7/2$^+$)	153.61	(3/2$^+$)	(E2)		Mult.: M1,E2 from α_K(exp); E2 required by level scheme.
246.7 *3*	2.4 *2*	582.3	(13/2$^-$)	335.5	(11/2$^-$)	(D+Q)		
297.8 *3*	2.4 *2*	695.27	(9/2$^+$)	397.49	(7/2$^+$)			
313.3 *3*	2.2 *2*	482.30		169.01	(7/2$^+$)			
328.0 *3*	7.1 *7*	328.00	(5/2$^+$)	0.0	5/2$^{(+)}$			
361.9 *3*	34 *3*	564.3		202.3	(9/2$^-$)			
367.2 *3*	6.4 *6*	695.27	(9/2$^+$)	328.00	(5/2$^+$)			
368.2 *3*	27 *3*	460.7		92.5	(7/2$^-$)			
374.3 *3*	5.4 *5*	374.22	(9/2$^+$)	0.0	5/2$^{(+)}$			
380.0 *3*	1.7 *2*	582.3	(13/2$^-$)	202.3	(9/2$^-$)			
385.8 *3*	6.2 *6*	721.2	(7/2$^-$,9/2,11/2$^-$)	335.5	(11/2$^-$)			
393.4 *3*	5.6 *6*	790.9	(11/2$^+$)	397.49	(7/2$^+$)	Q		
443.5 *3*	2.9 *3*	612.6	(11/2$^+$)	169.01	(7/2$^+$)	Q		
471.8 *3*	16 *2*	564.3		92.5	(7/2$^-$)			
482.3 *3*	12 *1*	482.30		0.0	5/2$^{(+)}$			
518.8 *3*	4.3 *4*	721.2	(7/2$^-$,9/2,11/2$^-$)	202.3	(9/2$^-$)			
526.3 *3*	1.5 *2*	695.27	(9/2$^+$)	169.01	(7/2$^+$)			
596.9 *3*	6.9 *7*	799.2		202.3	(9/2$^-$)			
628.6 *3*	4.3 *4*	721.2	(7/2$^-$,9/2,11/2$^-$)	92.5	(7/2$^-$)			
693.5[#] *3*	56 *6*	1091.0		397.49	(7/2$^+$)			
706.7 *3*	5.0 *5*	799.2		92.5	(7/2$^-$)			
937.3 *3*	100 *10*	1091.0		153.61	(3/2$^+$)			

[†] Additional information 1.
[‡] From 1991Ii02, unless otherwise noted. Uncertainties are not given in 1991Ii02 and the evaluator has assigned an uncertainty of

Continued on next page (footnotes at end of table)

^{123}La ε decay 1991Ii02 (continued)

$\gamma(^{123}Ba)$ (continued)

0.3 keV for Eγ and 10% for Iγ.

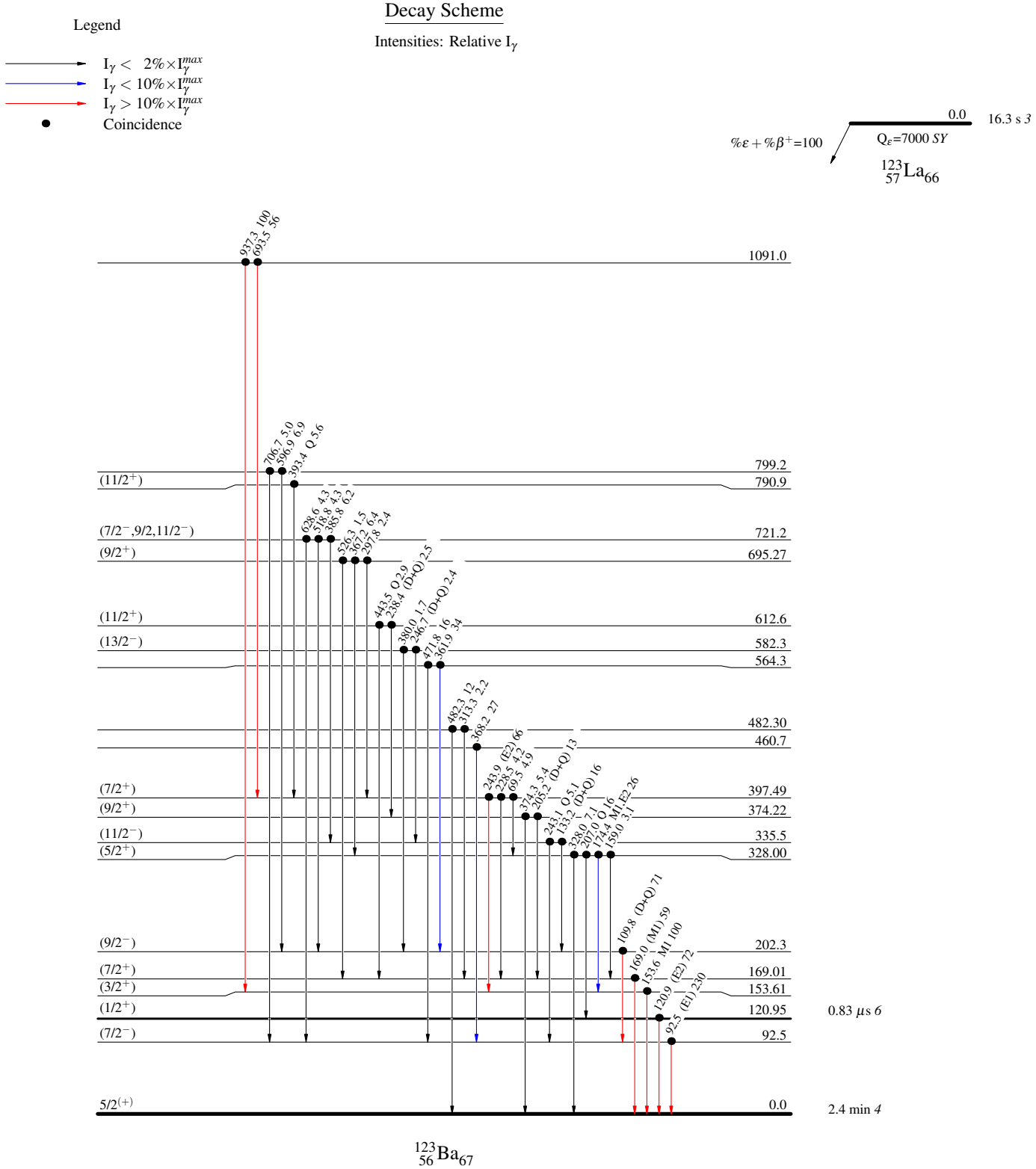
[#] Eγ=635.9 in 1991Ii02 was corrected by the evaluator.

[@] From Adopted Gammas. Arguments from 1991Ii02 based on measured α_K(exp) are given under comments. Conversion coefficients are not explicitly given in 1991Ii02.

^{123}La ε decay 1991Ii02

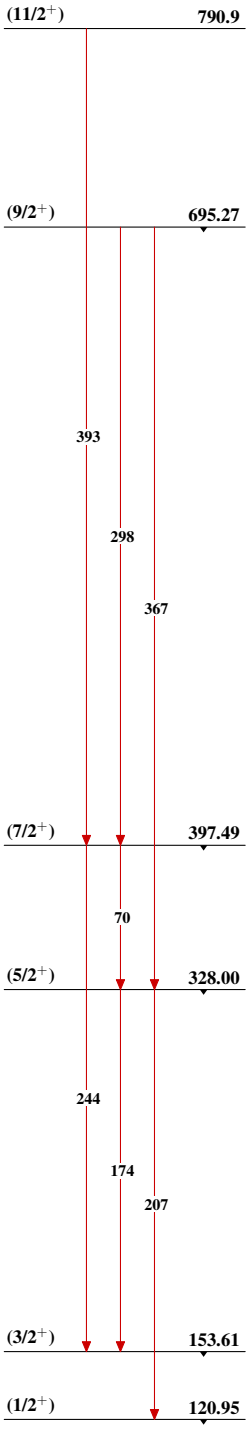
Decay Scheme

Intensities: Relative I_γ



^{123}La ε decay 1991Ii02

Band(A): 1/2[411] band (1991Ii02)



$^{123}_{56}Ba_{67}$