^{216}At α decay (0.30 ms) 1994Li10,1991Ry01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	K. Auranen and E. A. Mccutchan	NDS 168, 117 (2020)	1-Aug-2020

Parent: ^{216}At: E=0.0; $J^\pi=1^{(-)}$; $T_{1/2}$=0.30 ms *3*; Q(α)=7950 *3*; %α decay=100.0

^{216}At-$T_{1/2}$: from 1951Me10.

^{216}At-J^π: from HF=2.4 for α decay to g.s. of ^{212}Bi with $J^\pi=1^{(-)}$.

1994Li10: ^{224}Ac activity produced by bombarding targets of ^{232}Th with 200-MeV protons followed by mass separation. Sources of ^{216}At were produced in secular equilibrium with ^{220}Fr and ^{224}Ac. Measured Eα, Iα, Eγ, Iγ, $\alpha\gamma$ coin, ce, α-ce coin, ce-γ coin using Ge detectors for γ rays and Si(Li) for conversion electrons.

α: Additional information 1.

^{212}Bi Levels

E(level)[†]	J^π[‡]	Comments
0.0	$1^{(-)}$	
115.2 *1*	$2^{(-)}$	
196 *16*		
213.1 *2*	(3^-)	
238.632 *2*	$0^{(-)}$	E(level): from the Adopted Levels.
250.7 *5*	(4^-)	
338 *16*		
415.2 *4*	$1^{(-)}$	
417.9 *2*		1994Li10 suggest $J^\pi=(2^-)$.
494.5 *4*		1994Li10 suggest $J^\pi=(3^-)$.
573? *16*		

[†] From a least-squares fit to γ-ray energies for $\Delta E<1$ keV and from measured Eα and Q(α) for $\Delta E>10$ keV, except where noted.

[‡] From the Adopted Levels.

α radiations

Eα[†]	E(level)	Iα[‡@]	HF[#]	Comments
7240 *15*	573?	0.06	68	Eα,Iα: from 1965Br11.
7317 *15*	494.5	0.09	82	Eα: from 1965Br11. Other 7317 in 1994Li10. Iα: other: 0.085 (1965Br11).
7392	417.9	<0.27	>43	Iα: 0.27 is given for Iα(7390) + Iα(7392) (1994Li10).
7394	415.2	<0.27	>43	Eα: other: 7390 keV *10* for 7394/7392 doublet (1964Mc21). Iα: 0.27 is given for Iα(7390) + Iα(7392) (1994Li10).
7470 *15*	338	<0.5	>41	Eα,Iα: from 1964Mc21.
7556	250.7	0.07 *3*	6.1×10^2 *27*	
7560 *15*	238.632	<0.5	>83	Eα,Iα: from 1964Mc21.
7593	213.1	0.16 *5*	3.5×10^2 *12*	
7610 *16*	196	<0.5	>110	Eα,Iα: from 1964Mc21.
7689	115.2	1.4 *2*	78 *14*	Eα: other: 7683 keV *10* (1964Mc21). Iα: other: 2.1 (1965Br11).
7802 *3*	0.0	97.5	2.4	Iα: other: 97 (1965Br11).

[†] From 1994Li10, decreased by 2 keV so Eα(g.s.)=7802 keV, except where noted.

[‡] From 1994Li10, except where noted otherwise.

[#] $r_0(^{212}Bi)$=1.5518 *18*, average of $r_0(^{214}Po)$=1.56062 *74*, $r_0(^{212}Po)$=1.5658 *59*, $r_0(^{212}Pb)$=1.54117 *28*, and $r_0(^{210}Pb)$=1.539616 *24* (2020Si16).

[@] Absolute intensity per 100 decays.

^{216}At α decay (0.30 ms) 1994Li10,1991Ry01 (continued)

γ(^{212}Bi)

Iγ normalization: Values reported by 1994Li10 are absolute and given as per 1000 decays.
K x ray=2.02% *20*, L x ray=0.92% *12* (1994Li10).

E_γ †	I_γ †#	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	α	Comments
37.6 *4*	0.03 *1*	250.7	(4⁻)	213.1	(3⁻)	M1	33.5 *12*	α(L)=25.6 *9*; α(M)=6.02 *21*; α(N)=1.54 *6*; α(O)=0.315 *11*; α(P)=0.0374 *14* α(L)exp=21 *6* (1994Li10).
97.9 *2*	0.20 *5*	213.1	(3⁻)	115.2	2(−)	M1(+E2)	9.1 *17*	α(K)=4.6 *42*; α(L)=3.4 *18*; α(M)=0.87 *51*; α(N)=0.22 *13*; α(O)=0.042 *23*; α(P)=0.0036 *14* I(K x ray)/Iγ=7.5 *15* (1994Li10).
x103.4 *2*	0.23 *5*					M1(+E2)	7.6 *17*	α(K)=4.0 *36*; α(L)=2.7 *14*; α(M)=0.69 *38*; α(N)=0.175 *96*; α(O)=0.033 *17*; α(P)=0.00289 *95* I(K x ray)/Iγ=5.5 *20* (1994Li10). E_γ: see ^{216}At α decay:J=4 dataset for possible alternative placement of this transition.
115.2 *1*	2.7 *2*	115.2	2(−)	0.0	1(−)	M1	6.80	α(K)=5.53 *8*; α(L)=0.972 *14*; α(M)=0.229 *4*; α(N)=0.0585 *9*; α(O)=0.01195 *17* α(P)=0.001423 *21* I(K x ray)/Iγ=5.0 *6* (1994Li10). K/L=6 *1* (1994Li10).
204.8 *5*	0.10 *3*	417.9		213.1	(3⁻)			
300.0 *3*	0.25 *5*	415.2	1(−)	115.2	2(−)	M1	0.464	α(K)=0.378 *6*; α(L)=0.0654 *10*; α(M)=0.01536 *22*; α(N)=0.00393 *6*; α(O)=0.000803 *12* α(P)=9.56×10^{-5} *14*
379.3 *3*	0.33 *7*	494.5		115.2	2(−)			
417.9 *2*	1.30 *20*	417.9		0.0	1(−)			

† From 1994Li10.
‡ From the Adopted Gammas. For the values where evidence is derived from this dataset, supporting measurements are given in the comments.
# For absolute intensity per 100 decays, multiply by 0.1.
x γ ray not placed in level scheme.

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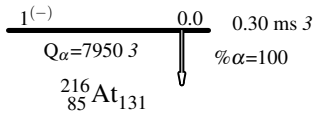
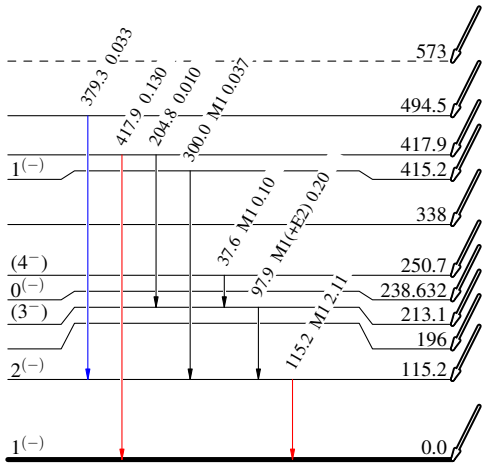
Decay Scheme

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

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$





$^{212}_{83}Bi_{129}$

Eα	Iα	HF
7240	0.06	68
7317	0.09	82
7392	<0.27	>43
7394	<0.27	>43
7470	<0.5	>41
7556	0.07	610
7560	<0.5	>83
7593	0.16	350
7610	<0.5	>110
7689	1.4	78
7802	97.5	2.4