Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 201,346 (2025)	21-Jan-2025

Q(β^-)=−3306 *16*; S(n)=7526 *18*; S(p)=2207 *17*; Q(α)=5887 *5* 2021Wa16
S(2n)=16707 *26*, S(2p)=6371 *16*, Q(ε)=5749 *14*, Q(εp)=1337 *14* (2021Wa16).

^{206}At Levels

Cross Reference (XREF) Flags

- A ^{206}Rn ε decay
- B ^{210}Fr α decay
- C (HI,xnγ)

E(level)†	J$^\pi$‡	$T_{1/2}$	XREF	Comments
0.0	(6)$^+$	30.5 min *6*	B	%α=0.90 *8*; %ε+%β^+=99.10 *8* μ=4.39 *17*; Q=−0.42 *22* J$^\pi$: From 2018Cu02 based on additivity-relation analysis of μ and favored α decay of ^{210}Fr (J^π=6$^+$). However, strong ^{206}At ε decay to 4$^+$ and 6$^+$ levels in ^{206}Po (1977Li16) would favor J^π=5$^+$. $T_{1/2}$: Weighted average of 29.5 min *6* (1961La02), 31.0 min *15* (1963Ho18), 32.8 min *5* (1964Th07), 31.4 min *7* (1970DaZM) all from α decay, and 29.3 min *4* (1977Li16) and 29.9 min *6* (2010Ka29) from ε decay. Other: 20 min *10* (1961Fo04). %α: Weighted average of 0.96 *9*, deduced from %α=0.88 *8* [1961La02 and %α(^{206}Po)=5], but using %α(^{206}Po)=5.45, and 0.73 % *15*, deduced from %α=0.70 *14* [1981Va27 and %α(^{206}Po)=5.2 *4*], but using %α(^{206}Po)=5.45. μ,Q: from measured hyperfine-structure constants and isotope shifts using the in-source resonance-ionization spectroscopy method. Magnetic moment is deduced using a reference value of μ=4.139 *37* for ^{211}At (2018Cu02). μ: From 4.39 *13*(stat)*11*(syst) using the hyperfine structure analysis in 2018Cu02 with statistical and systematic uncertainties added in quadrature. Value is deduced using a reference value of μ=4.139 *37* for ^{211}At. Q: From −0.42 *10*(stat)*20*(syst) using the hyperfine structure analysis in 2018Cu02 with statistical and systematic uncertainties added in quadrature. δ<r^2>(^{206}At,^{205}At)=0.020 fm^2 *7*(stat)*1*(syst) (2018Cu02). Configuration=$\pi(h^{+1}_{9/2})\otimes\nu(f^{-1}_{5/2})$.
0+x	(7$^+$)		A C	Additional information 1. E(level): Could be associated with the 5.7-keV or 31.05-keV level. Configuration=$\pi(h^{+1}_{9/2})\otimes\nu(f^{-1}_{5/2})$. The assignment is tentative.
5.7? *3*			B	E(level): From γ-ray energy differences. No direct decay to the ground state was observed.
31.05? *22*			B	E(level): From γ-ray energy differences. No direct decay to the ground state was observed.
126.30 *10*			B	
137.57? *23*			B	
148.00 *10*			B	
201.0? *4*			B	
322.30? *10*			B	
340.40 *10*			B	
444.2 *5*			B	
657.3? *3*			B	
686.0+x *10*	(9$^+$)		C	
806.7+x *14*	(10$^-$)	813 ns *21*	C	$T_{1/2}$: From [122γ(t)+686γ(t)] in 2009Dr08. Others: 410 ns *80* (1999Fe10) from $\gamma\gamma$(t) data by gating on gamma-rays above and below the isomer and 377 ns *44*

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Adopted Levels, Gammas (continued)

^{206}At Levels (continued)

E(level)†	Jπ‡	XREF	Comments
			(2010Ka29) from 121γ(t). It should be noted, however, that the reported time-measurements windows are 300 ns in 1999Fe10 and 400 ns in 2010Ka29, which are shorter than the reported $T_{1/2}$. Configuration=$\pi(h^{+1}_{9/2})\otimes\nu(i^{-1}_{13/2})$. The assignment is tentative.
1276.3+x *14*	(11$^+$)	C	
1347.7+x *17*		C	
1393.3+x *17*		C	
1422.4+x *16*	(12$^-$)	C	
1622.5+x *15*		C	
1740.7+x *20*		C	
1797.4+x *19*	(13$^-$)	C	
1814.3+x *17*	(14$^-$)	C	
1961.8+x *17*		C	
2002.3+x *17*	(14$^-$)	C	
2010.4+x *16*		C	
2103.3+x *19*		C	
2133.3+x *20*		C	
2251.1+x *17*		C	
2291.3+x *19*		C	
2552.1+x *20*		C	
2645.3+x *20*		C	
2796.3+x *19*		C	
2902.3+x *22*		C	

† From a least-squares fit to Eγ, unless otherwise stated.
‡ From (HI,xnγ) (1999Fe10), unless otherwise stated.

γ(^{206}At)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.	α#	Comments
126.30		120.7@ *3*	16 *5*	5.7?				
		126.3 *1*	100 *7*	0.0	(6)$^+$			
137.57?		106.5@ *2*	20 *6*	31.05?				
		137.6@ *3*	100 *15*	0.0	(6)$^+$			
148.00		116.9@ *3*	36 *8*	31.05?				
		148.0 *1*	100 *13*	0.0	(6)$^+$			
201.0?		195.3@ *2*	100	5.7?				
322.30?		322.3@ *1*	100	0.0	(6)$^+$			
340.40		340.4 *1*	100	0.0	(6)$^+$			
444.2		444.2 *5*	100	0.0	(6)$^+$			
657.3?		626.3@ *3*	44 *15*	31.05?				
		651.5@ *3*	100 *8*	5.7?				
686.0+x	(9$^+$)	686 *1*		0+x	(7$^+$)			
806.7+x	(10$^-$)	121‡ *1*	100‡	686.0+x	(9$^+$)	[E1]	0.288 *7*	B(E1)(W.u.)=1.05×10^{-7} *4* α(K)=0.228 *6*; α(L)=0.0461 *12*; α(M)=0.01097 *29* α(N)=0.00280 *7*; α(O)=0.000573 *15*; α(P)=6.97×10^{-5} *18*
1276.3+x	(11$^+$)	590‡ *1*	100‡	686.0+x	(9$^+$)			
1347.7+x		541‡ *1*	100‡	806.7+x	(10$^-$)			

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Adopted Levels, Gammas (continued)

γ(^{206}At) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Comments
1393.3+x		117[‡] *1*	100[‡]	1276.3+x	(11^+)	
1422.4+x	(12^-)	616[‡] *1*	100[‡]	806.7+x	(10^-)	
1622.5+x		346[‡] *1*	100[‡]	1276.3+x	(11^+)	
1740.7+x		393[‡] *1*	100[‡]	1347.7+x		
1797.4+x	(13^-)	375[‡] *1*	100[‡]	1422.4+x	(12^-)	
1814.3+x	(14^-)	392[‡] *1*	100[‡]	1422.4+x	(12^-)	
1961.8+x		339[‡] *1*	100[‡]	1622.5+x		
2002.3+x	(14^-)	188 *1*		1814.3+x	(14^-)	E_γ: From (HI,xnγ) (1999Fe10).
		580 *1*		1422.4+x	(12^-)	E_γ: From (HI,xnγ) (1999Fe10).
2010.4+x		388 *1*		1622.5+x		E_γ: From (HI,xnγ) (1999Fe10).
		734 *1*		1276.3+x	(11^+)	E_γ: From (HI,xnγ) (1999Fe10).
2103.3+x		289[‡] *1*	100[‡]	1814.3+x	(14^-)	
2133.3+x		319[‡] *1*	100[‡]	1814.3+x	(14^-)	
2251.1+x		249 *1*		2002.3+x	(14^-)	E_γ: From (HI,xnγ) (1999Fe10).
		289 *1*		1961.8+x		E_γ: From (HI,xnγ) (1999Fe10).
		437 *1*		1814.3+x	(14^-)	E_γ: From (HI,xnγ) (1999Fe10).
2291.3+x		289[‡] *1*	100[‡]	2002.3+x	(14^-)	
2552.1+x		301[‡] *1*	100[‡]	2251.1+x		
2645.3+x		831[‡] *1*	100[‡]	1814.3+x	(14^-)	
2796.3+x		505 *1*		2291.3+x		E_γ: From (HI,xnγ) (1999Fe10).
		693 *1*		2103.3+x		E_γ: From (HI,xnγ) (1999Fe10).
2902.3+x		257[‡] *1*	100[‡]	2645.3+x		

[†] From ^{210}Fr α decay (2005Ku06), unless otherwise stated.
[‡] From (HI,xnγ) (1999Fe10).
[#] Additional information 2.
[@] Placement of transition in the level scheme is uncertain.

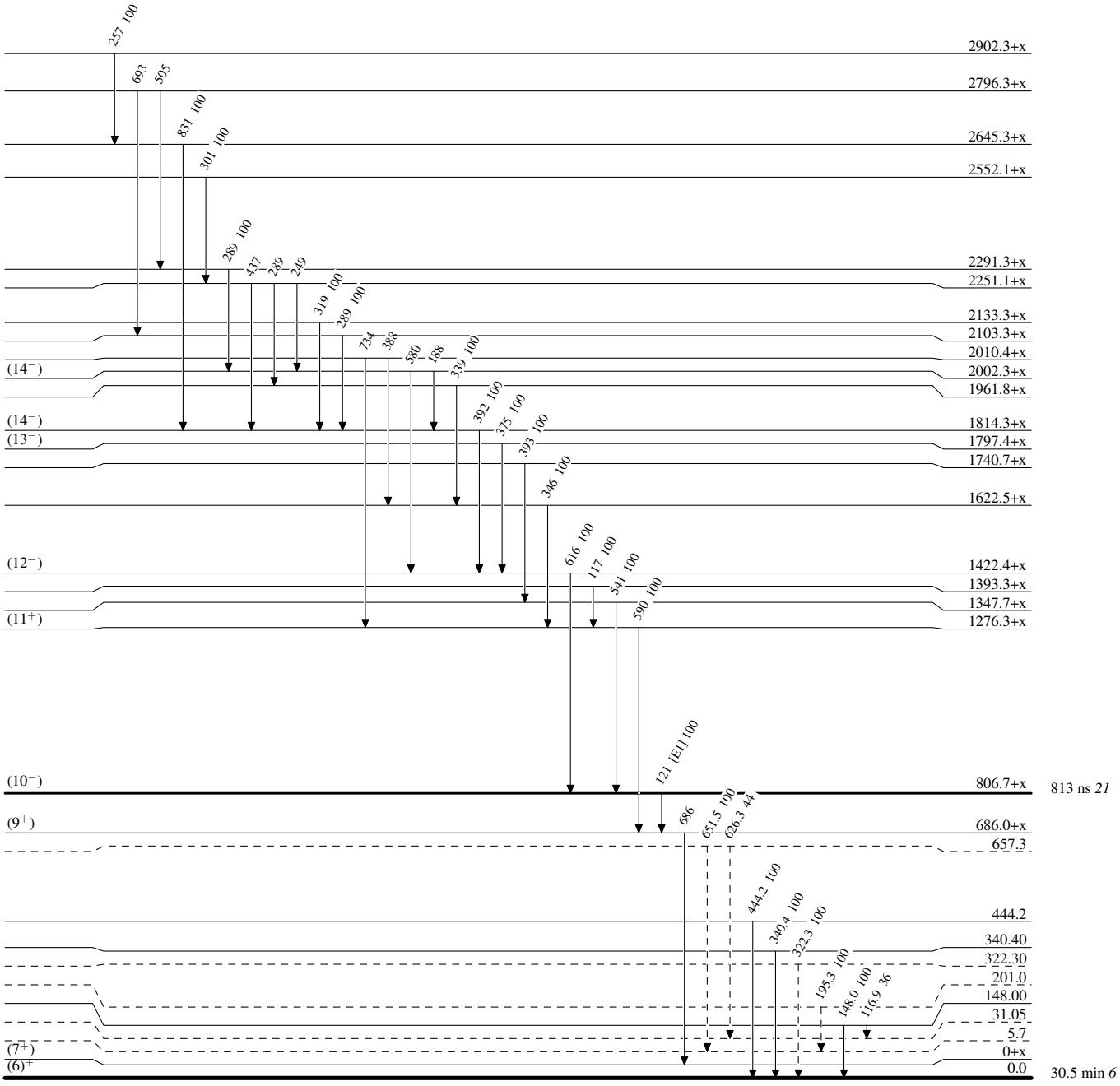
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{206}_{85}At_{121}$

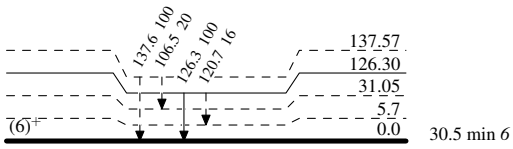
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{206}_{85}At_{121}$