Adopted Levels, Gammas

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Khalifeh Abusaleem	NDS 116, 163 (2014)	31-Dec-2012

Q(β^-)=2124 *3*; S(n)=5026.0 *25*; S(p)=5572.0 *24*; Q(α)=4676 *13* 2012Wa38
Q(β^-)= 2124 *3*; S(n)= 5026 *3*; S(p)= 5572 2; Q(α)= 4810 *50* 2003Au03.

Calculations, compilations, systematics:
α-decay half life: 2012Po01.
Level structure in odd-odd actinides: 1994So16.
Octupole deformation in odd-odd nuclei: 1988Sh01.
Spontaneous emission of heavy ions: 1986Po06.
Discussion of level configurations: 1995So11.
Allowed beta transitions in heavy nuclei: 2009So02, 2006Xu10.

1969Lu12 assign a 4.27 MeV α with %α=5.5×10^{-6} *22* to this nucleus. However, such α decay gives an α HF=3.9×10^{-4}, an extremely unreasonable value. It appears that the α has been misassigned.

2006Xu10: Observed β^-delayed fission of ^{228}Ac. ^{228}Ac source was chemically prepared from Thorium solution, then exposed to mica foils (α-detector) and HPGe (γ-detector) for 720 days. 17 α-events were observed. These were interpreted from ^{228}Ac fission based on analysis of β^- decay energy and fission systematics. Also, several γ-rays were observed and interpreted from the β^- decay of ^{228}Ac. These γ-rays are presented in figure 2 of 2006Xu10. No γ-uncertainty, intensity, or level energies are given. Probability of β^-delayed fission ($N_{\beta DF}/N_\beta$) was found to be 5×10^{-12} 2.

^{228}Ac Levels

Cross Reference (XREF) Flags

A ^{228}Ra β^- decay

E(level)	J$^\pi$	T$_{1/2}$	XREF	Comments
0	3$^+$	6.15 h *2*	A	%β^-=100 J$^\pi$: J from $\beta\gamma(\theta)$ and β(CP γ)(θ) (1967Bh01); π from log *ft*=9.74 (log $f^{1u}t$=10.7) in β^- decay to 1$^-$ level in ^{228}Th. Configuration=((π 3/2[651])(ν 3/2[631])), K=3. T$_{1/2}$: from 1985Sk02. Other: 6.13 h (1931Cu01).
6.28 *3*	1$^-$		A	J$^\pi$: log *ft*≈7.1 from 0$^+$; ce data consistent with multipolarity(6.28γ)=M2, not consistent with E2, E3, or M3. Configuration=((π 3/2[532])(ν 3/2[631])), K=0.
6.670 *20*	1$^+$		A	J$^\pi$: log *ft*≈6.3 from 0$^+$; E2 γ to 3$^+$ g.s. Configuration=((π 3/2[651])(ν 3/2[631])), K=0.
20.19 *3*	1$^-$		A	J$^\pi$: log *ft*=6.20 from 0$^+$; E1 γ to 1$^+$ level. Configuration=((π 3/2[532])(ν 5/2[633])), K=1.
33.07 *11*	1$^+$		A	J$^\pi$: log *ft*=5.12 from 0$^+$; M1+E2 γ to 1$^+$ level. Configuration=((π 3/2[651])(ν 5/2[633])), K=1.

Adopted Levels, Gammas (continued)

$\gamma(^{228}Ac)$

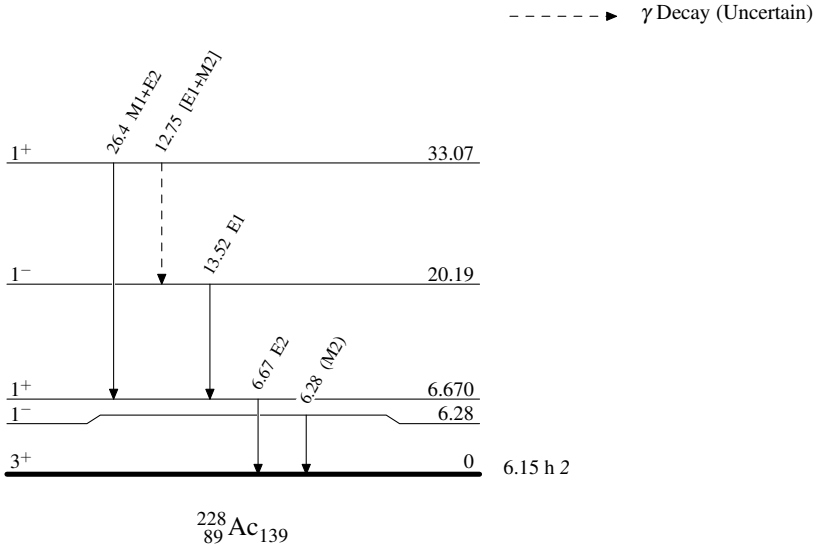
γ data are from ^{228}Ra β^- decay.

E_i(level)	J_i^π	E_γ	E_f	J_f^π	Mult.	α[‡]	$I_{(\gamma+ce)}$[†]
6.28	1^-	6.28 *3*	0	3^+	(M2)	6.68×10^6 *19*	
6.670	1^+	6.67 *2*	0	3^+	E2	1.56×10^6 *4*	
20.19	1^-	13.52 *2*	6.670	1^+	E1	5.86 *9*	
33.07	1^+	12.75[#] *5*	20.19	1^-	[E1+M2]		≈100
		26.4 *1*	6.670	1^+	M1+E2		≈100

[†] Relative I(γ+ce) from level.
[‡] 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.
[#] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme



$^{228}_{89}Ac_{139}$