

^{98}In ε decay (0.89 s) 2019Pa16

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen, Balraj Singh		NDS 164, 1 (2020)	15-Feb-2020

Parent: ^{98}In : $E=0.82\times 10^3$ 73; $J^\pi=(9^+)$; $T_{1/2}=0.89$ s 2; $Q(\varepsilon)=1293\times 10^1$ 40; $\% \varepsilon + \% \beta^+$ decay=100.0

^{98}In - $J^\pi, T_{1/2}$: From ^{98}In Adopted Levels.

^{98}In - $Q(\varepsilon)$: Measured by 2019Pa16 from β^+ spectrum. Other: 13740 300 from systematic trend (2017Wa10).

^{98}In - $\% \varepsilon + \% \beta^+$ decay: Delayed proton branch from the decay of 0.89-s activity of ^{98}In is measured by 2019Pa16 as 44% 2.

2019Pa16: $E(^{124}\text{Xe})=345$ MeV/nucleon beam incident on a 740 mg/cm² thick ^9Be target at the RIKEN-RIBF facility. The identification of the nuclide of interest was made through the BigRIPS separator and the ZeroDegree spectrometer by determining the atomic number and the mass-to-charge ratio of the ion using the tof-B ρ - ΔE method. The secondary beam was stopped in the double-sided silicon strip detector of the WAS3ABi spectrometer. The γ rays were detected by EURICA array comprising of 84 HPGe detectors. Measured $E\gamma$, $\beta\gamma$ -coin, βp -coin, $\beta p\gamma$ -coin, half-lives by $\beta\gamma(t)$, $\beta p(t)$. Deduced β^+ end-point energies, $Q(\varepsilon)$ value, excitation energy of the (9^+) isomer. Comparisons with previous experimental data and shell-model calculations.

 ^{98}Cd Levels

E(level)	J^π [†]	$T_{1/2}$ [†]	Comments	
0.0 [‡]	0 ⁺	9.3 s 1		
1395.5 [‡] 2	(2 ⁺)			
2083.3 [‡] 3	(4 ⁺)			
2281.7 [‡] 3	(6 ⁺)	13 ns 2	%IT=100	
2428.9 [‡] 4	(8 ⁺)	154 ns 16	%IT=100	
6585?	(10 ⁺)			

[†] From the Adopted Levels.

[‡] Seq.(A): Yrast cascade.

 ε, β^+ radiations

E(decay)	E(level)	$I\beta^+$ [‡]	$I\varepsilon$ [‡]	Log ft	$I(\varepsilon + \beta^+)$ ^{†‡}	Comments
(7.2×10^3 # 8)	6585?	<7.8	<0.17	>4.8	<8.0	av $E\beta=2.86\times 10^3$ 41; $\varepsilon K=0.019$ 10; $\varepsilon L=0.0023$ 13; $\varepsilon M+=0.0006$ 3
(1.13×10^4 8)	2428.9	56 2	0.27 8	5.0	56 2	av $E\beta=4.90\times 10^3$ 41; $\varepsilon K=0.0042$ 12; $\varepsilon L=0.00053$ 15; $\varepsilon M+=0.00013$ 4 $I(\varepsilon + \beta^+)$: given as ≈ 56 2 in 2019Pa16.

[†] From 2019Pa16.

[‡] Absolute intensity per 100 decays.

Existence of this branch is questionable.

 $\gamma(^{98}\text{Cd})$

E_γ [†]	I_γ ^{†‡}	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult.	α [#]	Comments
147.2 1	97 13	2428.9	(8 ⁺)	2281.7	(6 ⁺)	(E2)	0.381	$\alpha(K)=0.306$ 6; $\alpha(L)=0.0609$ 11; $\alpha(M)=0.01198$ 22 $\alpha(N)=0.00202$ 4; $\alpha(O)=6.04\times 10^{-5}$ 10
198.4 1	99 11	2281.7	(6 ⁺)	2083.3	(4 ⁺)	[E2]	0.1336	$\alpha(K)=0.1105$ 17; $\alpha(L)=0.0188$ 3; $\alpha(M)=0.00366$ 6 $\alpha(N)=0.000627$ 10; $\alpha(O)=2.28\times 10^{-5}$ 4
687.8 2	92 11	2083.3	(4 ⁺)	1395.5	(2 ⁺)	[E2]		

Continued on next page (footnotes at end of table)

^{98}In ε decay (0.89 s) 2019Pa16 (continued) $\gamma(^{98}\text{Cd})$ (continued)

E_γ [†]	I_γ ^{†‡}	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult.	Comments
1395.5 2	100 10	1395.5	(2 ⁺)	0.0	0 ⁺	[E2]	
4157 [@]		6585?	(10 ⁺)	2428.9	(8 ⁺)		This γ not observed by 2019Pa16. From the upper limit of 8% for $\varepsilon+\beta^+$ feeding quoted in 2019Pa16, $I_\gamma < 14$.

[†] From 2019Pa16.

[‡] For absolute intensity per 100 decays, multiply by 0.56 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.

@ Placement of transition in the level scheme is uncertain.

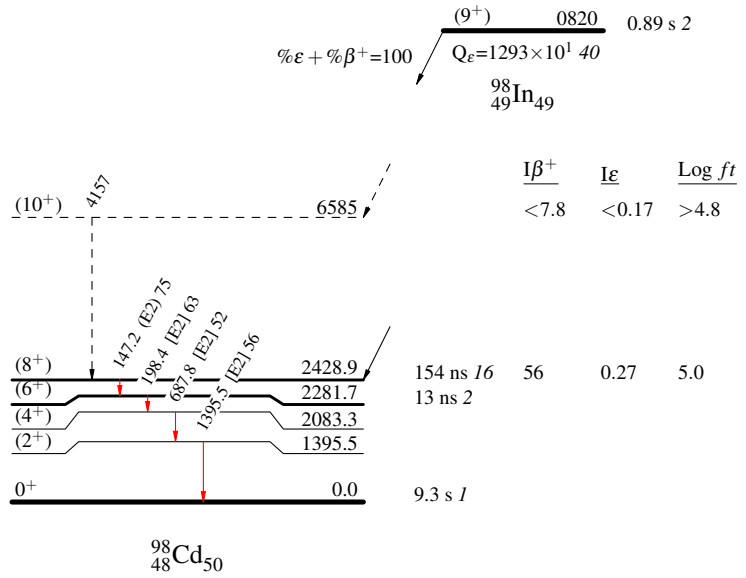
⁹⁸In ε decay (0.89 s) 2019Pa16

Decay Scheme

Intensities: I_(γ+ε) per 100 parent decays

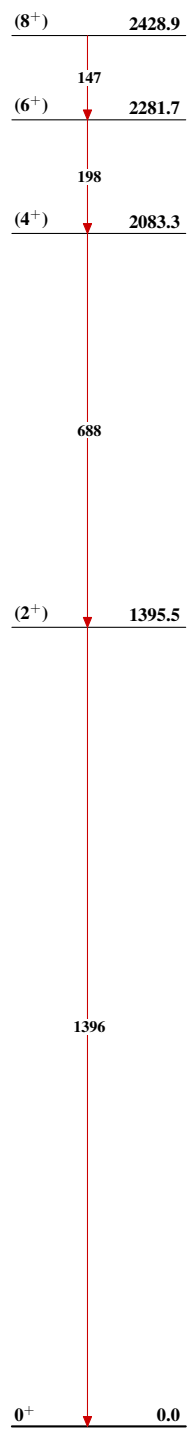
Legend

- I_γ < 2% × I_γ^{max}
- I_γ < 10% × I_γ^{max}
- I_γ > 10% × I_γ^{max}
- - - - -> γ Decay (Uncertain)



^{98}In ϵ decay (0.89 s) 2019Pa16

Seq.(A): Yrast cascade

 $^{98}_{48}\text{Cd}_{50}$