^{123}In IT decay (1.4 μs) 2004Sc42

Type	Author	History Citation	Literature Cutoff Date
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Parent: ^{123}In: E=2078.1 *6*; J^{π}=(17/2$^-$); $T_{1/2}$=1.4 μs *2*; %IT decay=100.0

2004Sc42: ^{123}In isomer was produced via the thermal-neutron induced fission of ^{239}Pu and ^{241}Pu. Fission fragments were separated by the LOHENGRIN mass spectrometer according to their mass to ionic charge ratios and detected in a ΔE gas detector. γ rays were detected with two large-volume Ge detectors and x rays and conversion electrons were detected with two Si(Li) detectors. Measured Eγ, Iγ, γγ-coin, γγ-coin, E(ce), γ(t). Deduced levels, J, π, $T_{1/2}$. Comparisons with shell-model calculations.

^{123}In Levels

E(level)†	J^{π}‡	$T_{1/2}$	Comments
0.0	9/2$^+$		
1027.5 *3*	(11/2$^+$)		
1165.9 *3*	(13/2$^+$)		
2046.6 *3*	(13/2$^-$)		J^{π}: the simultaneous feeding of the 11/2$^+$ and 13/2$^+$ levels at 1027.5 and 1165.9, respectively, (and no feeding to 9/2$^+$ g.s. and 11/2$^+$ level at 1027.5), suggests a spin and parity assignment 13/2$^-$ or 15/2$^+$ for this level. The negative parity assignment is preferred by analogy with the heavier In isotopes, but a positive parity cannot be completely ruled out (2004Sc42).
2078.1 *6*	(17/2$^-$)	1.4 μs *2*	J^{π}: proposed by 2004Sc42 based on 31.5γ probably (E2) to (13/2$^-$). $T_{1/2}$: from 880.7γ(t)+1166.0γ(t) (2004Sc42).

† From a least-squares fit to γ-ray energies.

‡ From Adopted Levels. Assignments for excited states are adopted from this study as proposed by 2004Sc42, based on systematics of neighboring odd-mass In isotopes and γ decay pattern.

γ(^{123}In)

Iγ normalization: From I(880.7γ)+I(1019.0γ)=100.

E_γ	I_γ†	E_i(level)	J_i^{π}	E_f	J_f^{π}	Mult.	α‡	Comments
31.5 *5*	1.01	2078.1	(17/2$^-$)	2046.6	(13/2$^-$)	(E2)	105	α(K)=20.1 *6*; α(L)=69.4 *21*; α(M)=14.1 *5* E_γ: from energy of conversion electron, observed in delayed ce spectrum with electron energy of 27.5 *5* corresponding to ce(L) line of 31.5γ. I_γ: from I(γ+ce) intensity balance, I(889.7γ)=107, an di(1019.0γ)=40. Mult.: suggested by the absence of crossover transition between 2078 level and 1166 level.
(138.5)		1165.9	(13/2$^+$)	1027.5	(11/2$^+$)			E_γ: from level-energy difference. This γ-ray was not observed by 2004Sc42 due to its low expected relative intensity of ≈6.
880.7 *2*	107	2046.6	(13/2$^-$)	1165.9	(13/2$^+$)			
1019.0 *3*	40	2046.6	(13/2$^-$)	1027.5	(11/2$^+$)			
1027.4 *3*	42	1027.5	(11/2$^+$)	0.0	9/2$^+$			
1166.0 *3*	100	1165.9	(13/2$^+$)	0.0	9/2$^+$			

† For absolute intensity per 100 decays, multiply by 0.68.

‡ 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.

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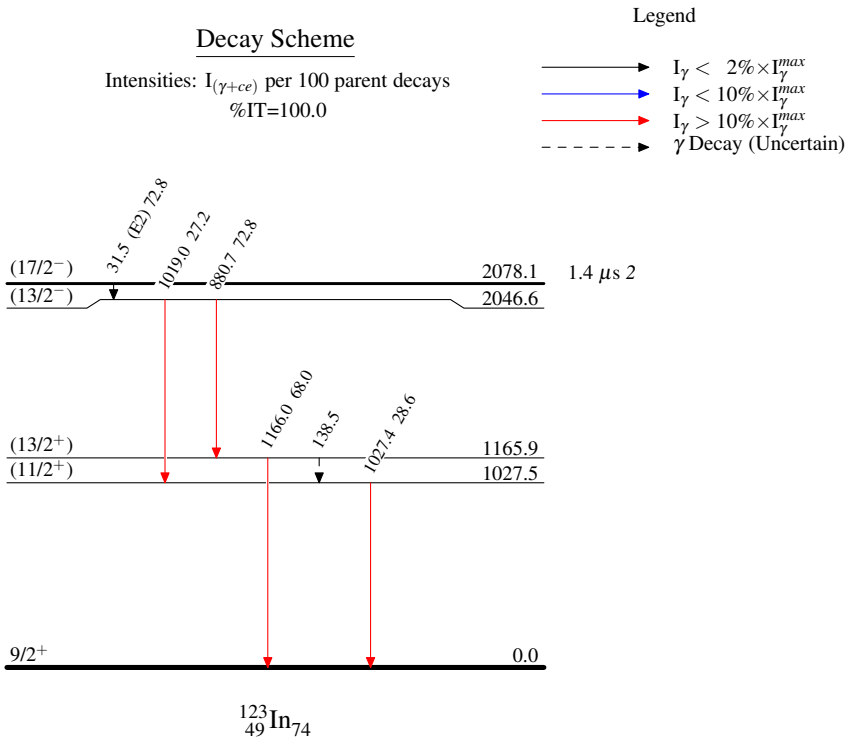
Decay Scheme

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

%IT=100.0



$^{123}_{49}In_{74}$