

<sup>76</sup>Co IT decay (2.96 μs) 2015So23

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Jun Chen and Ameenah R. Farhan		NDS 194,3 (2024)	8-Jan-2024

Parent: <sup>76</sup>Co: E=638.4 8; J<sup>π</sup>=(3<sup>+</sup>); T<sub>1/2</sub>=2.96 μs +29-25; %IT decay≈100

<sup>76</sup>Co-%IT decay: Assumed ≈100% IT decay.

**2015So23:** <sup>76</sup>Co isomers produced in <sup>9</sup>Be(<sup>238</sup>U,F), E=345 MeV/nucleon reaction with the <sup>238</sup>U beam provided by the RIBF accelerator complex at RIKEN facility. Fission fragments were separated and analyzed by BigRIPS separator, transported to focal plane of ZeroDegree spectrometer. Particle identification was achieved by ΔE-TOF-Bρ method. Silicon detector stack WAS3ABi was used for ion implantation and β detection. Gamma rays were detected using EURICA array of 12 HPGe cluster detectors arranged in three rings at 51°, 90° and 120° with respect to the beam direction. About 1000 <sup>76</sup>Co ions were implanted in the WAS3ABi Si detector stack. Measured Eγ, Iγ, γγ-coin, βγ(t), half-lives of isomers in <sup>76</sup>Co and <sup>76</sup>Ni. Deduced isomers, levels, J, π, configurations. Shell-model calculation with LNPS interaction for structure of <sup>76</sup>Co.

<sup>76</sup>Co Levels

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub>	Comments
0.0	(1 <sup>-</sup> ) <sup>#</sup>		
446.4 7	(2 <sup>-</sup> ) <sup>#</sup>		
638.4 8	(3 <sup>+</sup> )	2.96 μs +29-25	E(level),J <sup>π</sup> : from <a href="#">2015So23</a> , based on shell-model predictions, with possible configuration= $\pi f_{7/2}^{-1} \otimes \nu p_{1/2}^{-1}$ . T <sub>1/2</sub> : from γ(t) ( <a href="#">2015So23</a> ).

<sup>†</sup> Deduced by evaluators from Eγ values. The ordering of the 192 and 446 transitions is based on shell-model calculations.

<sup>‡</sup> As given in Fig. 4 of [2015So23](#), based on shell-model calculations.

<sup>#</sup> Possible member of  $\pi f_{7/2}^{-1} \otimes \nu g_{9/2}^{-1}$  multiplet.

γ(<sup>76</sup>Co)

E <sub>γ</sub>	E <sub>i</sub> (level)	J <sub>i</sub> <sup>π</sup>	E <sub>f</sub>	J <sub>f</sub> <sup>π</sup>	Mult.	α <sup>†</sup>	Comments
192.02 30	638.4	(3 <sup>+</sup> )	446.4	(2 <sup>-</sup> )	[E1]	0.0064	B(E1)(W.u.)=1.79×10 <sup>-8</sup> 16 In deducing B(E1)(W.u.), 100% branch is assumed for 192γ. Multipolarity of 192γ is proposed (by <a href="#">2015So23</a> ) as E1 based on comparison of the measured half-life with expected half-lives for different mutipolarities of 192 and 446 γ rays: M1, E2, E3 for intraband transitions with assumed 1 W.u. transition probability; E1, M2, E3 for interband transitions with theoretical transition probabilities from shell-model calculations.
446.4 7	446.4	(2 <sup>-</sup> )	0.0	(1 <sup>-</sup> )			

<sup>†</sup> 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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Legend

## Decay Scheme

%IT  $\approx$  100

● Coincidence

