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^{43}S IT decay (415 ns)   2000Sa21,2009Ga05

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History

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Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen[#]	NDS 126, 1 (2015)	31-Mar-2015

Parent: ^{43}S: E=320.7 5; J$^\pi$=(7/2$^-$); T$_{1/2}$=415 ns 5; %IT decay=100.0

^{43}S-J$^\pi$,T$_{1/2}$: From Adopted Levels.

2000Sa21, 2001Sa72: ^{43}S was produced by fragmentation of ^{48}Ca beam at 60 MeV/nucleon on a tantalum target. Measured magnetic rigidity of particles to deduce mass, TOF measurements, ΔE-E measurement with an array of four-element silicon detector telescope. Delayed γ-rays measured with 4π NaI array surrounding the detector telescope. Precision mass measurement is reported in addition to a new isomer in ^{43}S. Delayed coincidence was measured using two Ge detectors and a Si telescope.

2009Ga05: E=60 MeV/nucleon ^{48}Ca beam was produced at GANIL. Fragments were separated by the LISE-2000 spectrometer. A 50 μm thick plastic scintillator at the focal plane was used for g factor measurement using the Time Dependent Perturbed Angular Distribution (TDPAD); four coaxial Ge detectors for γ detection. Measured Eγ, g factor. Comparison with various calculations such as shell-model, particle+rotor model, generator coordinate method (GCM), and Gaussian overlap approximation (GOA).

2012Ka36: ^{43}S was produced by Be(^{238}U,Fγ) with E=345 MeV/nucleon ^{238}U beam from the RIBF accelerator at RIKEN on a Be target. Fission fragments were separated and analyzed by BigRIPS separator, transported to focal plane of ZeroDegree spectrometer and finally implanted in an aluminum stopper. Particle identification was achieved by ΔE-tof-Bρ method. Delayed γ-rays from microsecond isomers were detected by three clover-type HPGe detectors (FWHM=2.1 keV at 1 MeV). Measured Eγ, Iγ, $\gamma\gamma$-coin, isomer half-life. Deduced level. Comparison with previous studies.

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^{43}S Levels

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E(level)	J$^\pi$	T$_{1/2}$	Comments
0	(3/2$^-$)		J$^\pi$: 3/2$^-$ proposed from shell-model calculations (2000Sa21,2009Ga05).
			Configuration=νp$_{3/2}$. This state is found to be part of well deformed K=1/2 decoupled rotational band from shell-model calculations (2009Ga05).
320.7 5	(7/2$^-$)	0.48 μs 5	μ=1.095 14 (2009Ga05)
			J$^\pi$: from agreement of g(Schmidt)=$-$0.546 for νf$_{7/2}$ with the experimental value (2009Ga05).
			T$_{1/2}$: from 2009Ga05, from time interval between an event in plastic scintillator and a signal in one of the Ge detectors. Others: 0.45 μs 5 (2000Sa21), 0.20 μs $+14-7$ (2012Ka36).
			μ: from g factor=$-$0.317 4 (2009Ga05) by TDPAD method, the uncertainty includes the statistical and that in the magnetic field. 2009Ga05 state that their g factor indicated that 320.5, J=7/2$^-$ level is built on νf$_{7/2}$ orbital.

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$\gamma(^{43}\text{S})$

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E$_\gamma$	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.	Comments
320.7 5	320.7	(7/2$^-$)	0	(3/2$^-$)	[E2]	B(E2)$\downarrow$=0.357$\times$10^{-4} 36 (2001Sa72)
						B(E2)=0.517$\times$10^{-4} 52 in 2000Sa21 (same group as 2001Sa72) seems a misprint.
						E$_\gamma$: weighted average of 320.5 5 (2009Ga05) and 320.9 5 (2012Ka36).
						Mult.: E1 and M1 give very large hindrance factors. E2 would be compatible with the measured lifetime.

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Decay Scheme

%IT=100.0

(7/2⁻) _____ 320.7 [E2] _____ 320.7   0.48 μs *5*

(3/2⁻) _____ 0

$^{43}_{16}$S$_{27}$