^{40}S β^- decay (8.8 s) 2006Wi10

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 140, 1 (2017)	30-Sep-2015

Parent: ^{40}S: E=0; $J^\pi=0^+$; $T_{1/2}$=8.8 s *22*; Q(β^-)=4720 *30*; %β^- decay=100.0

^{40}S-$T_{1/2}$: From Adopted Levels of ^{40}S, taken from 1986Du07.

^{40}S-Q(β^-): From 2012Wa38.

2006Wi10 (also 1998WiZX,1998WiZV): ^{40}S isotope was obtained from the decay of ^{40}P isotope produced by fragmentation of a ^{48}Ca beam at 70 MeV/nucleon bombarding a 254 mg/cm^2 ^{9}Be target at NSCL, Michigan facility. The fragments were separated by A1200 fragment separator and identified using energy loss (ΔE) versus time-of-flight (TOF) measured by a 500−μm Si PIN diode (ΔE) and a thin plastic scintillator (TOF), and implanted into 17-mil targets on a rotatable wheel. β particles were detected with a 1-mm-thick plastic scintillator directly downstream of the Al targets and γ rays were detected by two Ge detectors (FWHM=2.5 and 2.9 keV at 1332 keV). Measured Eγ, Iγ, Eβ, Iβ, $\gamma\gamma$-coin, $\beta\gamma$-coin. Deduced levels, J, π, β-decay branching ratios, log *ft*. Comparisons with shell-model calculations.

1986Du07: ^{40}S ions were produced by fragmentation of a 60 MeV/nucleon ^{40}Ar beam on a 190 mg/cm^2 Be target at GANIL. Fragments were separated by the LISE spectrometer. β particles were detected with a 1-mm-thick plastic scintillator and γ rays were detected with a 174 cm^3 intrinsic Ge detector. Measured Eγ, Iγ, decay curves. Deduced $T_{1/2}$, γ-ray branching ratios. Reported four γ rays at 211.6, 431.9, 677.5 and 888.6.

^{40}Cl Levels

E(level)[†]	J^π[‡]
0	2^-
211.56 *9*	1^-
431.61 *7*	(1^-,2)
889.02 *10*	1^+
1292.75 *11*	(1^+)
1998.02 *21*	(1^+)
2306.23 *13*	1^+

[†] From a least-squares fit to γ-ray energies.
[‡] From Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*	Comments
(2.41×10^3 *3*)	2306.23	46 *4*	3.7 *2*	av Eβ=1009 *67* Iβ^-: 2006Wi10 give 47 *4*.
(2.72×10^3 *3*)	1998.02	10 *2*	4.6 *2*	av Eβ=1155 *67*
(3.43×10^3 *3*)	1292.75	5 *4*	5.4 *4*	av Eβ=1494 *68* Iβ^-: 2006Wi10 give 6 *3*.
(3.83×10^3 *3*)	889.02	35 *5*	4.7 *2*	av Eβ=1690 *68* Iβ^-: 2006Wi10 give 36 *4*.
(4.72×10$^{3\#}$ *3*)	0	<0.5	>8.8[1*u*]	av Eβ=2136 *69* Iβ^-: from 2006Wi10, shell-model prediction; intensity balance gives 3 *7* (or <10).

[†] Deduced by evaluator based on γ-ray intensity imbalance at each level with a normalization of 0.52 *3* from 2006Wi10, unless otherwise noted.
[‡] Absolute intensity per 100 decays.
[#] Existence of this branch is questionable.

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$\gamma(^{40}Cl)$

Iγ normalization: Deduced by 2006Wi10 from relative intensities of strong γ rays from ^{40}Cl β^- decay observed in the saturation spectra. The value is 0.54 *2* deduced by evaluator assuming Σ(Iγ to g.s.)=100.

E_γ [†]	I_γ [†‡]	E_i(level)	J_i^π	E_f	J_f^π	Comments
211.59 *11*	100 *3*	211.56	1^-	0	2^-	Additional information 1.
403.70 *12*	12.6 *15*	1292.75	(1^+)	889.02	1^+	
431.57 *7*	49 *5*	431.61	$(1^-,2)$	0	2^-	Additional information 2.
457.4 *6*	7.7 *19*	889.02	1^+	431.61	$(1^-,2)$	
677.41 *12*	52 *7*	889.02	1^+	211.56	1^-	Additional information 3.
705.20 *23*	9.5 *20*	1998.02	(1^+)	1292.75	(1^+)	
889.04 *17*	21 *3*	889.02	1^+	0	2^-	Additional information 4.
1013.57 *13*	47 *3*	2306.23	1^+	1292.75	(1^+)	
1081.33 *18*	38 *5*	1292.75	(1^+)	211.56	1^-	
1292.87 *21*	16.4 *24*	1292.75	(1^+)	0	2^-	
1786.6 *3*	9.6 *21*	1998.02	(1^+)	211.56	1^-	
1874.41 *19*	42 *5*	2306.23	1^+	431.61	$(1^-,2)$	

[†] From 2006Wi10.
[‡] For absolute intensity per 100 decays, multiply by 0.52 *3*.

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Decay Scheme

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