

Adopted Levels, Gammas

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

$Q(\beta^-)=4720$ 30; $S(n)=7750$ 50; $S(p)=17300$ 90; $Q(\alpha)=-12870$ 70 [2012Wa38](#)

$S(2n)=12119$ 8, $S(2p)=33250$ 70 ([2012Wa38](#)).

First identification of ^{40}S nuclei by [1971Ar32](#) in $^{232}\text{Th}(^{40}\text{Ar},X)$ at $E=290$ MeV.

Mass measurements: [2009Ri12](#), [2007Ju03](#), [2000Sa21](#) (also [2001Sa72](#)).

Other reactions:

[2011FuZZ](#): $^9\text{Be}(^{48}\text{Ca},X)$ $E=345$ MeV/nucleon. Measured thick target fragmentation. Deduced σ .

[2006Kh08](#): $\text{Si}(^{40}\text{S},X)$ $E=30$ - 65 MeV/nucleon. Measured energy-integrated reaction. Deduced radii ($r_0^2=1.282$ fm² 25, isospin dependence.

[2006Ro34](#): $^2\text{H}(^{42}\text{S},X)$ $E=99.8$ MeV/nucleon. Measured production σ .

[1999Ai02](#): $\text{Si}(^{40}\text{S},X)$ $E=38$ - 80 MeV/nucleon. Measured mean energy-integrated cross sections, deduced strong absorption radii, $r_0^2=1.29$ fm² 8.

[1997Fo01](#): $^{208}\text{Pb}(^{37}\text{Cl},X)$ $E=230$ MeV. Measured yield.

[1991Zh24](#): $\text{Th}(p,X)$ $E=800$ MeV. Measured fragment mass, charge ratio. Deduced mass excess.

[1986Du07](#): $^9\text{Be}(^{40}\text{Ar},X)$ $E=60$ MeV/nucleon. Measured $\beta\gamma(t)$. Deduced $T_{1/2}$, evidence for residuals production.

 ^{40}S LevelsCross Reference (XREF) Flags

A	^{40}P β^- decay (150 ms)	D	$^9\text{Be}(^{48}\text{Ca},X\gamma)$
B	^{41}P β^-n decay (101 ms)	E	$^{208}\text{Pb}(^{36}\text{S},X\gamma)$
C	$^1\text{H}(^{40}\text{S},^{40}\text{S}')$	F	Coulomb excitation

E(level) [†]	J ^π	T _{1/2}	XREF	Comments
0	0 ⁺	8.8 s 22	ABCDEF	$\% \beta^- = 100$ $T_{1/2}$: from 1986Du07 .
903.69 7	2 ⁺	14.1 ps +17-14	ABCDEF	$B(E2)\uparrow=0.0334$ 36 (1996Sc31) $\mu=-0.02$ 12 (2006Da08 , 2014StZZ) μ : from measured g-factor=-0.01 6 using transient field technique in Coulomb excitation (2006Da08). J^π : Coulomb excited from 0 ⁺ . $T_{1/2}$: deduced by evaluator from measured $B(E2)$ by 1996Sc31 in Coulomb excitation and adopted $E_\gamma=903.68$ 9. $\beta_2(p,p')=0.35$ 5 (1999Ma63), $\beta_2(\text{Coul. ex.})=0.284$ 16 (1996Sc31). J^π : 1013.17γ to 2 ⁺ ; probable member of 2-phonon triplet. $J^\pi=0^+$ is not excluded but similarity with ^{42}Ar states suggests 4 ⁺ is more likely.
1916.84 21	(4 ⁺)		A	J^π : (2 ⁺) assigned by 2001Wi21 in ^{40}P β^- decay based on probable member of 2-phonon triplet, but $J=(4^+)$ from γ-ray anisotropy in $^9\text{Be}(^{48}\text{Ca},X\gamma)$ (2002So14) and from yrast band structure in $^{208}\text{Pb}(^{36}\text{S},X\gamma)$ (2010Wa12).
2254.79 12	(4 ⁺)		A DE	
3236.1 3			A	
3489.46 18	(1 ⁻)		A	J^π : 3489.6γ to 0 ⁺ ; log $ft=5.5$ from (2 ⁻ ,3 ⁻) parent.
3828	(6 ⁺)		E	E(level): from $^{208}\text{Pb}(^{36}\text{S},X\gamma)$ (2010Wa12). J^π : 2010Wa12 proposed $J^\pi=(6^+)$ for this level with $J^\pi=(4^+)$ for 2255 level based on band structure. However, 2001Wi21 in ^{40}P β^- decay propose $J^\pi=(2^+)$ for the 2255 level.
3947.0 3			A	
4138.30 20	(1 ⁻ ,2 ⁻ ,3 ⁻)		A	J^π : 3234.7γ to 2 ⁺ ; probable allowed β feeding from (2 ⁻ ,3 ⁻).
4724.61 23			A	J^π : suggested by 2001Wi21 in ^{40}P β^- decay as possible member of

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{40}S Levels (continued)

<u>E(level)[†]</u>	<u>J^π</u>	<u>XREF</u>	<u>Comments</u>
5009.4 4	(1 ⁻ ,2 ⁻ ,3 ⁻)	A	3-phonon triplet since the level decays to members of 2-phonon triplet. J ^π : 4105.7γ to 2 ⁺ ; probable allowed β feeding from (2 ⁻ ,3 ⁻).

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

γ(^{40}S)

<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_γ[†]</u>	<u>I_γ[†]</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult.</u>	<u>Comments</u>
903.69	2 ⁺	903.68 9	100	0	0 ⁺	E2	B(E2)(W.u.)=8.2 9 Mult.: from Coulomb excitation.
1916.84	(4 ⁺)	1013.17 20	100	903.69	2 ⁺		
2254.79	(4 ⁺)	1351.10 14	100 7	903.69	2 ⁺		Mult.: γ(θ) in $^9\text{Be}(^{48}\text{Ca},X\gamma)$ allows ΔJ=2, Q or ΔJ=0, D+Q.
		2254.5 [‡] 9	<4	0	0 ⁺		
3236.1		981.2 4	100	2254.79	(4 ⁺)		
3489.46	(1 ⁻)	2585.6 4	12.9 24	903.69	2 ⁺		
		3489.6 4	100 10	0	0 ⁺		
3828	(6 ⁺)	1572		2254.79	(4 ⁺)		E _γ : from $^{208}\text{Pb}(^{36}\text{S},X\gamma)$ (2010Wa12).
3947.0		1692.6 9	25 9	2254.79	(4 ⁺)		
		3043.2 4	100 12	903.69	2 ⁺		
4138.30	(1 ⁻ ,2 ⁻ ,3 ⁻)	648.82 15	13.7 12	3489.46	(1 ⁻)		
		3234.7 4	100 7	903.69	2 ⁺		
4724.61		2469.79 20	100 14	2254.79	(4 ⁺)		
		2808.2 9	86 24	1916.84	(4 ⁺)		
5009.4	(1 ⁻ ,2 ⁻ ,3 ⁻)	1773.2 [‡] 7	8.5 24	3236.1			
		4105.7 4	100 14	903.69	2 ⁺		

[†] From ^{40}P β⁻ decay, except where noted.

[‡] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)