

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Ninel Nica, John Cameron and Balraj Singh		NDS 113,1 (2012)	31-Dec-2011

$Q(\beta^-) = -1142.11$ 19; $S(n) = 9889.22$ 19; $S(p) = 13095.3$ 19; $Q(\alpha) = -9011.3$ 4 2012Wa38

Note: Current evaluation has used the following Q record -1142.14 19 9889.2719 13095.319-9011.3635 2011AuZZ.

$S(2n) = 16875.10$ 19, $S(2p) = 25285$ 14 (2011AuZZ).

Values in 2003Au03: $Q(\beta^-) = -1142.22$ 19, $S(n) = 9889.04$ 21, $Q(\alpha) = -9008.08$ 22, $S(2n) = 16874.92$ 22. $S(p)$ and $S(2p)$ are the same as in 2011AuZZ.

Identification of ^{36}S in mass spectrometer studies by A.O. Nier: Phys. Rev. 53, 282 (1938); measured ratio of ^{36}S to ^{32}S .

1971Ar32: production of ^{36}S in $^{232}\text{Th}(^{40}\text{Ar}, X)$ at 290 MeV fragmentation reaction.

1983Ry04: $^{36}\text{S}(e, e)$ $E = 120, 240, 320$ MeV. Measured $\sigma(\theta)$, deduced charge radius.

1985Gy02, 1985GyZZ: $^{36}\text{S}(\pi^-, \pi^-)$ $E = 48.4$ MeV, measured $\sigma(\theta)$.

1985Ko43: $^{20}\text{Ne}(^{16}\text{O}, ^{16}\text{O}')$ $E(\text{c.m.}) = 24.5\text{--}35.5$ MeV, deduced resonances.

1985Sc05: measured muonic atom x rays, deduced rms charge radii. Observed muonic x-ray energies: 515.985 14 (2p $\rightarrow$ 1s), 616.28 8 (3p $\rightarrow$ 1s), 651.30 10 (4p $\rightarrow$ 1s), 667.63 12 (5p $\rightarrow$ 1s).

1997Is02: $^{37}\text{Cl}(\gamma, p)$ $E \leq 32$ MeV, measured E_γ , I_γ . GDR features deduced.

1999Ai02: $\text{Si}(^{36}\text{S}, X)$ $E = 46.17$ MeV/nucleon, measured energy integrated cross sections, deduced radius.

Additional information 1.

 ^{36}S LevelsCross Reference (XREF) Flags

A	$^{36}\text{P} \beta^-$ decay (5.6 s)	G	Coulomb excitation	M	$^{115}\text{In}(^{34}\text{S}, X\gamma)$
B	$^{36}\text{Cl} \varepsilon$ decay (3.01×10^5 y)	H	$^{37}\text{Cl}(n, d)$	N	$^{160}\text{Gd}(^{36}\text{S}, ^{36}\text{S}'\gamma), (^{34}\text{S}, ^{36}\text{S}'\gamma)$
C	$^{34}\text{S}(t, p)$	I	$^{37}\text{Cl}(d, ^3\text{He})$	O	$^{160}\text{Gd}(^{37}\text{Cl}, X\gamma)$
D	$^{34}\text{S}(t, p\gamma)$	J	$^{37}\text{Cl}(^{36}\text{S}, ^{36}\text{S}')$	P	$^{176}\text{Yb}(^{36}\text{S}, X)$:tentative
E	$^{36}\text{S}(p, p'), (\alpha, \alpha')$	K	$^{40}\text{Ar}(\gamma, \alpha)$		
F	$^{36}\text{S}(\text{pol } d, d')$	L	$^{40}\text{Ar}(^3\text{He}, ^7\text{Be})$		

E(level) [†]	J^π [‡]	$T_{1/2}$ [#]	XREF	Comments
0	0 ⁺	stable	ABCDEFGHIJKLMN	J^π : spin measurement by microwave spectroscopy (1949Lo21). Nuclear rms charge radius = 3.2982 fm 21 (2004An14 evaluation); 3.2985 fm 24 from 2008 update of 2004An14. Mean radius $r_0^2 = 1.26$ fm ² 10 from measured integrated $\sigma_R = 2.44$ b 19 at 46.17 MeV/nucleon in $\text{Si}(^{36}\text{S}, X)$ reaction (1999Ai02). $\mu = +2.6$ 10 (2008Sp01) $T_{1/2}$: from DSA in Coul. Ex. (2008Sp01). Other: 76 fs 21 (1972Sa09), also given in 2001Ra27 evaluation. J^π : E2 γ to 0 ⁺ . μ : transient field technique in Coulomb excitation in inverse kinematic reaction, g factor = +1.3 5 (2008Sp01). J^π : E0 transition to 0 ⁺ . $\mu = +2.4$ 15 (2008Sp01) B(E3) = 0.008 3 (2002Ki06 evaluation), from β_3 in (p, p') (1990Ho19). $T_{1/2}$: from DSA in Coul. Ex. (2008Sp01). Other: 0.8 ps +4-3 (DSA in (t, p γ) (1972Sa09). μ : transient field technique in Coulomb excitation in inverse kinematic reaction, g factor = +0.8 5 (2008Sp01).
3290.9 3	2 ⁺	83 fs 7	A CDEFG IJk MNOP	
3346 4	0 ⁺	8.8 ns 2	CDE G I k	
4192.7 5	3 ⁻	0.62 ps 7	A CDEFG J MNOP	
4523.0 6	1 ⁺	0.017 ps 8	CDE G I k	
4575.2 7	2 ⁺	55 fs 10	A CDE G I k	
5021.5 3	4 ⁻		A E MNOP	XREF: P(?).
5206.1 3	5 ⁻		A E M OP	XREF: P(?).
5251.2 10	3 ⁻	70 fs 30	A CDE N	J^π : log $f_t = 5.57$ from 4 ⁻ ; γ to 2 ⁺ .

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Adopted Levels, Gammas (continued) ^{36}S Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF		Comments
5338 3			E		
5391.4 9	2 ⁺	>0.2 ps	CDE		XREF: E(5379). T _{1/2} : additional limit: <30 ns.
5462 3	3 ⁺		E		
5509.1 5	(2,4)	0.19 ps 4	CDE		XREF: E(5514). J ^π : 4 ⁻ proposed in (p,p'),(α,α').
5573.1 7	1 ⁻	<0.14 ps	CDE		
5781.1 10				M	
5830.9 7	3 ⁻		A E		XREF: E(5837). J ^π : log ft=4.66 from 4 ⁻ ; γ to 2 ⁺ .
6186.9 8	3 ⁻	55 fs 20	CDE		XREF: E(6180).
6225.2 10	2 ⁺	<20 fs	DE		XREF: E(6220).
6350 3			E		
6472 3	1 ⁻		E		
6514.4 4	4 ⁺	<0.2 ps	A CDE	I	XREF: E(6510).
6553 3			E		
6690	(6 ⁺)			N	
7120 14	(1,2) ⁺	<0.2 ps	CD	I	
7271.9 3	(3 ⁻ ,4 ⁻ ,5 ⁻)		A		J ^π : log ft=4.62 from 4 ⁻ .
7710 25				I	

[†] From least-squares fit to E_γ data, assuming 0.3 keV uncertainty for each E_γ.

[‡] Mainly from γγ(θ) and lin pol data in (t,pγ) and from comparison of σ(θ) data in (p,p'),(α,α') to DWBA calculations.

[#] From DSA in (t,pγ), unless otherwise stated.

γ(^{36}S)

E _i (level)	J _i ^π	E _γ	I _γ	E _f	J _f ^π	Mult.	δ	Comments
3290.9	2 ⁺	3290.8 6	100	0	0 ⁺	E2		B(E2)(W.u.)=2.83 24
3346	0 ⁺	3346		0	0 ⁺	E0		Decay takes place by pair formation.
4192.7	3 ⁻	901.5 4	100	3290.9	2 ⁺	E1(+M2)	+0.03 3	B(E1)(W.u.)=0.00135 15
4523.0	1 ⁺	1232.1 4	33 13	3290.9	2 ⁺			
		4522.2 15	100 13	0	0 ⁺	M1		B(M1)(W.u.)=0.010 5
4575.2	2 ⁺	1284.2	100	3290.9	2 ⁺	M1(+E2)	+0.06 6	B(M1)(W.u.)=0.19 4
5021.5	4 ⁻	828.8	100 2	4192.7	3 ⁻	M1		
		1730.6	3 2	3290.9	2 ⁺			
5206.1	5 ⁻	184.6	100.0 23	5021.5	4 ⁻	D		
		1013.4	26.8 18	4192.7	3 ⁻	Q		
5251.2	3 ⁻	680		4575.2	2 ⁺			
		1059.6 4	43 11	4192.7	3 ⁻			
		1961.0 4	100 11	3290.9	2 ⁺	D+Q		
5391.4	2 ⁺	816.2 4	18 9	4575.2	2 ⁺			
		5391.0	100 9	0	0 ⁺			
5509.1	(2,4)	1316.8 4	52 12	4192.7	3 ⁻			
		2217.7 3	100 12	3290.9	2 ⁺	D+Q		
5573.1	1 ⁻	2282.1 3	100	3290.9	2 ⁺			
5781.1		760.4	100	5021.5	4 ⁻			
5830.9	3 ⁻	579.7	1.1 4	5251.2	3 ⁻			
		809.4	15.2 9	5021.5	4 ⁻			
		1255.7	12.7 9	4575.2	2 ⁺			
		1638.2	100 3	4192.7	3 ⁻			
		2539.9	49.3 23	3290.9	2 ⁺			
6186.9	3 ⁻	1994.8 4	33 11	4192.7	3 ⁻			

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Adopted Levels, Gammas (continued)

$\gamma(^{36}\text{S})$ (continued)						Comments
$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	
6186.9	3^-	2894.8 5	100 11	3290.9	2^+	
6225.2	2^+	1649.2 5	100 13	4575.2	2^+	
		2933.0 10	32 13	3290.9	2^+	
6514.4	4^+	2321.6 [†]	100	4192.7	3^-	E_γ, I_γ : from ^{36}P β^- decay (1986Du07); in (t,p γ), 1971OI02 assign 3290.9 level as final state for single transition from 6514.4 level. For this γ ray, $E_\gamma=3223.3$ and $\delta=-0.03$ 3.
6690	(6^+)	1485	100	5206.1	5^-	
7120	$(1,2)^+$	2550	28 7	4575.2	2^+	
		3830	11 7	3290.9	2^+	
		7120	100 7	0	0^+	
7271.9	$(3^-, 4^-, 5^-)$	757.5	32 5	6514.4	4^+	
		1441.0	12 5	5830.9	3^-	
		2020.6	100 7	5251.2	3^-	
		2065.7	15 5	5206.1	5^-	
		2250.3	32 5	5021.5	4^-	
		3079.1	54 12	4192.7	3^-	

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

Legend

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)

