

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 152, 1 (2018)	30-Sep-2017

$Q(\beta^-)=2937.7$ ;  $S(n)=8036.7$ ;  $S(p)=15150.40$ ;  $Q(\alpha)=-9329.16$  [2017Wa10](#)

$S(2n)=12340.7$ ,  $S(2p)=29000.70$  ([2017Wa10](#)).

First identification of  $^{38}\text{S}$  nuclide is by [1958Ne10](#), according to the [2012Th10](#) compilation of isotope discovery.

Other reactions:

[1994De17](#):  $^{40}\text{Ar}(e,e'2p)$   $E=14.5$  GeV; measured secondary protons.

[1999Ai02](#): strong absorption radius deduced from measured cross section.

[2005O104](#):  $^{208}\text{Pb}(^{38}\text{S},X\gamma)$ :  $\gamma$  rays at 1292 and 1513 reported using CLARA Ge detector array and PRISMA magnetic spectrometer. (Preliminary results).

Structure calculations: [2015St17](#), [2015Wu07](#), [2014Eb02](#), [2013Xu01](#), [2012Ut02](#), [2011Ka03](#), [2011Si09](#), [2004In01](#), [2002Ro03](#), [1986Wo02](#). Consult NSR database for 16 other theory references.

Comparison of experimental and theoretical g factors: [2007Be42](#).

[Additional information 1](#).

 $^{38}\text{S}$  LevelsCross Reference (XREF) Flags

<b>A</b>	$^{38}\text{P}$ $\beta^-$ decay (0.64 s)	<b>F</b>	$^{36}\text{S}(t,p\gamma)$	<b>K</b>	$^{160}\text{Gd}(^{36}\text{S},^{38}\text{S}\gamma)$
<b>B</b>	$^{39}\text{P}$ $\beta^-n$ decay (0.28 s)	<b>G</b>	$^{36}\text{S}(^{14}\text{C},^{12}\text{C})$	<b>L</b>	$^{208}\text{Pb}(^{36}\text{S},^{38}\text{S}\gamma)$
<b>C</b>	$^1\text{H}(^{38}\text{S},^{38}\text{S}')$	<b>H</b>	$^{36}\text{S}(^{18}\text{O},^{16}\text{O}),(^{18}\text{O},^{16}\text{O}\gamma)$	<b>M</b>	Coulomb excitation
<b>D</b>	$^{12}\text{C}(^{48}\text{Ca},X\gamma)$	<b>I</b>	$^{40}\text{Ar}(^{11}\text{B},^{13}\text{N})$		
<b>E</b>	$^{36}\text{S}(t,p)$	<b>J</b>	$^{40}\text{Ar}(^{13}\text{C},^{15}\text{O})$		

E(level) <sup>†</sup>	$J^\pi$	$T_{1/2}$	XREF	Comments
0	$0^+$	170.3 min 7	<b>ABCDEFGHIJKLM</b>	$\% \beta^- = 100$ $T_{1/2}$ : weighted average of 172 min 1 ( <a href="#">1958Ne10</a> ), 169.6 min 7 ( <a href="#">1971En01</a> ), and 170.0 min 8 ( <a href="#">1972Vi11</a> ).
1292.02 20	$2^+$	3.3 ps +5-4	<b>A CDEFGHIJKLM</b>	$\mu = +0.26$ 10 ( <a href="#">2006St21,2006Da08</a> ) $B(E2)\uparrow = 0.0235$ 30 ( <a href="#">1996Sc31</a> ) $J^\pi$ : $L(t,p)=2$ from $0^+$ . $T_{1/2}$ : from $B(E2)\uparrow = 0.0235$ 30 in Coulomb excitation ( <a href="#">1996Sc31</a> ). Other: $>0.31$ ps from DSAM in (t,p). $\mu$ : from $g = +0.13$ 5 ( <a href="#">2006St21,2006Da08</a> : high-velocity transient-field technique in Coulomb excitation). Compilation: <a href="#">2014StZZ</a> .
2805.1 20	$(2^+)$	0.08 ps +9-5	<b>D F KL</b>	$J^\pi$ : 1513 $\gamma$ to $2^+$ ; 0 and 4 less likely from RUL; shell-model predicts $2^+$ ( <a href="#">1994Fo04</a> ) in $^{160}\text{Gd}(^{36}\text{S},^{38}\text{S}\gamma)$ . $T_{1/2}$ : from DSAM in (t,p).
2825.3 11	$4^+$	$>0.14$ ps	<b>DEFGH KL</b>	$J^\pi$ : $L(t,p)=4$ from $0^+$ . $T_{1/2}$ : from DSAM in (t,p).
3375 17	$(2^+)$		<b>E I</b>	$J^\pi$ : $L(t,p)=2,(1)$ from $0^+$ with $L=2$ preferred. $J^\pi = 1^-$ not completely excluded.
3516.3 7	$(1,2^+)$		<b>A</b>	$J^\pi$ : 3526.0 $\gamma$ to $0^+$ ; $3^-$ is less likely but not completely ruled out.
3658 6	$(6^+)$		<b>DE KL</b>	XREF: E(3690)K(3674)L(3674). $J^\pi$ : $L(t,p)=5,6$ ; $\gamma$ to $4^+$ ; shell-model predicts $6^+$ ( <a href="#">1994Fo04</a> ) in $^{160}\text{Gd}(^{36}\text{S},^{38}\text{S}\gamma)$ .
3725.3 15			<b>GH</b>	
4336 20	$(4^+)$		<b>E</b>	$J^\pi$ : $L(t,p)=4,(3)$ with $L=4$ preferred. $J^\pi = 3^-$ not completely excluded.
4461 22	$(3^-,4^+)$		<b>E GH</b>	E(level): weighted average of 4430 20 from ( $^{14}\text{C},^{12}\text{C}$ ) and 4478 22 from (t,p). $J^\pi$ : $L(t,p)=3,4$ .
4990.2 11	$(2^+)$		<b>A E</b>	XREF: E(4955).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) $^{38}\text{S}$  Levels (continued)

<u>E(level)<sup>†</sup></u>	<u>J<sup>π</sup></u>	<u>XREF</u>	<u>Comments</u>
5064 27	(3 <sup>-</sup> )	<b>E</b>	J <sup>π</sup> : L(t,p)=2,(1,3) with L=2 preferred. J <sup>π</sup> =1 <sup>-</sup> ,3 <sup>-</sup> not completely excluded.
5278 28	(2 <sup>+</sup> )	<b>E</b>	J <sup>π</sup> : L(t,p)=3,(2) with L=3 preferred. J <sup>π</sup> =2 <sup>+</sup> not completely excluded.
6005.6 11	(3 <sup>-</sup> )	<b>A E GH</b>	J <sup>π</sup> : L(t,p)=2,(1,3) with L=2 preferred. J <sup>π</sup> =1 <sup>-</sup> ,3 <sup>-</sup> not completely excluded.
6605 60		<b>E</b>	J <sup>π</sup> : L(t,p)=3,(4) with L=3 preferred. J <sup>π</sup> =4 <sup>+</sup> not completely excluded.

<sup>†</sup> From a least-squares fit to  $\gamma$ -ray energies where available and the rest from (t,p), unless otherwise noted.

 $\gamma(^{38}\text{S})$ 

<u>E<sub>i</sub>(level)</u>	<u>J<sub>i</sub><sup>π</sup></u>	<u>E<sub>γ</sub><sup>†</sup></u>	<u>I<sub>γ</sub></u>	<u>E<sub>f</sub></u>	<u>J<sub>f</sub><sup>π</sup></u>	<u>Mult.</u>	<u>Comments</u>
1292.02	2 <sup>+</sup>	1292.0 2	100	0	0 <sup>+</sup>	E2	B(E2)(W.u.)=6.3 9 E <sub>γ</sub> : weighted average of 1292.3 4 from $^{38}\text{P}$ $\beta^-$ decay (0.64 s) and 1291.9 2 from (t,p $\gamma$ ). Others: 1296.2 4 from ( $^{18}\text{O},^{16}\text{O}\gamma$ ), 1292 4 from ( $^{48}\text{Ca},\text{X}\gamma$ ), 1286 19 from Coulomb excitation.
2805.1	(2 <sup>+</sup> )	1513 2	100	1292.02	2 <sup>+</sup>		E <sub>γ</sub> : from (t,p $\gamma$ ). Other: 1515 6 from ( $^{48}\text{Ca},\text{X}\gamma$ ).
2825.3	4 <sup>+</sup>	1533.2 10	100	1292.02	2 <sup>+</sup>		E <sub>γ</sub> : from (t,p $\gamma$ ). Other: 1538.2 5 from ( $^{18}\text{O},^{16}\text{O}\gamma$ ), 1534 5 from ( $^{48}\text{Ca},\text{X}\gamma$ ).
3516.3	(1,2 <sup>+</sup> )	2224.3 8	100 18	1292.02	2 <sup>+</sup>		E <sub>γ</sub> ,I <sub>γ</sub> : from $^{38}\text{P}$ $\beta^-$ decay.
		3516.0 10	56 18	0	0 <sup>+</sup>		E <sub>γ</sub> ,I <sub>γ</sub> : from $^{38}\text{P}$ $\beta^-$ decay.
3658	(6 <sup>+</sup> )	833 5	100	2825.3	4 <sup>+</sup>		E <sub>γ</sub> : from ( $^{48}\text{Ca},\text{X}\gamma$ ). Other: 849 from ( $^{36}\text{S},^{38}\text{S}\gamma$ ).
3725.3		900 1	100	2825.3	4 <sup>+</sup>		E <sub>γ</sub> : from ( $^{18}\text{O},^{16}\text{O}\gamma$ ) with value adjusted by 3 keV lower than the original value=903 1 since all values in that dataset are systematically lower than values in other studies.
4990.2	(2 <sup>+</sup> )	3698.0 10	100	1292.02	2 <sup>+</sup>		E <sub>γ</sub> : from $^{38}\text{P}$ $\beta^-$ decay.
6005.6	(3 <sup>-</sup> )	4713.3 10	100	1292.02	2 <sup>+</sup>		

<sup>†</sup> Values from ( $^{18}\text{O},^{16}\text{O}\gamma$ ) seem systematically higher as compared to those in  $\beta^-$  decay, (t,p $\gamma$ ) and  $^{160}\text{Gd}(^{36}\text{S},^{38}\text{S}\gamma)$ : 4 keV for 1296 $\gamma$ , 5 keV for 1538 $\gamma$ .

**Adopted Levels, Gammas**Level Scheme

Intensities: Relative photon branching from each level

