

$^{32}\text{S}(\alpha, \alpha'\gamma)$  1971Ga01, 1979Za01, 1988Si14

Type	Author	History Citation	Literature Cutoff Date
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Includes  $^4\text{He}(^{32}\text{S}, \alpha'\gamma)$  from 1988Si14 and 1980Ba40.

1971Ga01 (also 1969Ga04): E=14.39 and 14.50 (1971Ga01) and E=11.40 MeV (1969Ga04)  $\alpha$  beams were produced from the Nuclear Physics Laboratory of Oxford University. Target was natural CsS with a thickness of about  $350 \mu\text{g}/\text{cm}^2$  on a gold backing.  $\alpha$  particles were detected with an annular surface-barrier silicon detector and  $\gamma$  rays were detected with a Ge(Li) detector. Measured  $E_\gamma$ ,  $I_\gamma$ ,  $\alpha\gamma(\theta)$ , Doppler-shift attenuation. Deduced levels, J,  $\pi$ , lifetimes, transition strengths. A 15% uncertainty is assigned and included due to imprecise knowledge of stopping power theory.

1979Za01: E=8.25 MeV  $\alpha$  beam was produced from the Utrecht 7-MV EN tandem accelerator. Target was natural ZnS (95% in  $^{32}\text{S}$ ) with a thickness of about  $200 \mu\text{g}/\text{cm}^2$ .  $\alpha$  particles were detected with a semiconductor detector and  $\gamma$  rays were detected with a NaI(Tl) detector. Measured  $E_\gamma$ ,  $I_\gamma$ ,  $\alpha\gamma(\theta, \text{B})$ . Deduced g-factor for 2230 level, using the IMPAC technique.

1988Si14: E=92 MeV  $^{32}\text{S}$  beam from the Koln FN tandem accelerator. Targets were 30 keV He ions implanted into Fe foils.  $\alpha$  particles were detected with a Si detector and  $\gamma$  rays were detected with a NaI(Tl) and a Ge detectors. Measured  $E_\gamma$ ,  $I_\gamma$ ,  $\alpha\gamma$ -coin,  $\gamma\gamma$ -coin,  $\gamma(\theta, \text{B})$ , Doppler-shift attenuation. Deduced lifetimes, g-factor using transient-field technique.

1980Ba40: E=70 MeV  $^{32}\text{S}$  beam was produced at Chalk River. Target was  $^4\text{He}$  implanted into a thin Cu foil. Scattered particles were momentum-analyzed with a Q3D spectrometer and detected with a surface barrier detector telescope;  $\gamma$  rays were detected with a Ge(Li) detector. Measured  $E_\gamma$ , Doppler-shift attenuation. Deduced lifetime for 2230 level. 1980Ba40 also report static electric quadrupole moment and B(E2) of 2230 level using Coulomb excitation of  $^{32}\text{S}$  with a  $^{208}\text{Pb}$  target. See Coulomb excitation for details.

 $^{32}\text{S}$  Levels

E(level) <sup>†</sup>	J $\pi$ <sup>‡</sup>	T <sub>1/2</sub> <sup>†</sup>	Comments
0	0 <sup>+</sup>		
2230 2	2 <sup>+</sup>	164 fs 11	T <sub>1/2</sub> : from DSAM in 1980Ba40, $\tau=236$ fs 16. Others: $\tau=230$ ps 60 (1971Ga01), 236 fs 18 (1988Si14). g-factor=+0.47 9 (1979Za01), using IMPAC technique and a lifetime value of 230 fs 16.
3777 2	0 <sup>+</sup>	0.73 ps 21	T <sub>1/2</sub> : from $\tau=1.05$ ps 30 (1971Ga01).
4278 2	2 <sup>+</sup>	33 fs 9	T <sub>1/2</sub> : from $\tau=0.048$ ps 13 (1971Ga01). J $\pi$ : 4 <sup>+</sup> from 1969Ga04 likely in error.
4458 3	4 <sup>+</sup>	137 fs 20	J $\pi$ : spin=4 from $\alpha$ -2228 $\gamma(\theta)$ and J(2230)=2, with 2228 $\gamma$ the sum of 4458 to 2230 and 2230 to g.s. transitions (1969Ga04). T <sub>1/2</sub> : from $\tau=0.198$ fs 29, weighted average of 0.207 fs 29 from DSAM in 1988Si14 and 0.18 ps 4 in 1971Ga01. The value from 1971Ga01 is obtained by combining value measured by 1971Ga01 and reanalysis of their earlier measurement in 1969Ga04. g-factor=+0.40 15 (1988Si14), using transient field technique and a known g-factor=0.50 3 for 2230 level.

<sup>†</sup> From 1971Ga01 with T<sub>1/2</sub> measured by DSAM, unless otherwise noted.

<sup>‡</sup> From Adopted Levels.

 $\gamma(^{32}\text{S})$ 

E $\gamma$ <sup>†</sup>	E <sub>i</sub> (level)	J $\pi$ <sub>i</sub>	E <sub>f</sub>	J $\pi$ <sub>f</sub>	Mult.	Comments
1547	3777	0 <sup>+</sup>	2230	2 <sup>+</sup>		
2048	4278	2 <sup>+</sup>	2230	2 <sup>+</sup>		
2228	4458	4 <sup>+</sup>	2230	2 <sup>+</sup>	E2	Mult., $\delta$ : $\delta(\text{O}/\text{Q})=0.10$ 10 from $\alpha\gamma(\theta)$ in 1969Ga04; M2 ruled out by RUL.
2230	2230	2 <sup>+</sup>	0	0 <sup>+</sup>		
4278	4278	2 <sup>+</sup>	0	0 <sup>+</sup>		

<sup>†</sup> From level-energy differences; transitions seen in 1971Ga01 but no E $\gamma$  values are listed.

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Level Scheme

