^{33}S(^{3}He,nγ) 1975Da14

$J^{\pi}=3/2^{+}$ for ^{33}S ground state.

1975Da14: A $^{3}He^{+}$ beam was produced from the University of Alberta Van de Graaff accelerator. Targets were 150 μg/cm^2 layers of Ag_2S (59% ^{33}S) on silver backings. At E(^{3}He)=6.375 MeV, neutrons were detected using an NE213 liquid scintillator placed at $\theta_{lab}=0°$, 10°, and 20°. At E(^{3}He)=6.660 MeV, neutrons were detected using the NE213 scintillator placed at $\theta_{lab}=0°$ and 20°. At E(^{3}He)=6.390 MeV, neutrons were detected using the NE213 scintillator placed at $\theta_{lab}=0°$ and neutron-coincidenct γ rays were detected using a 10% efficient Ge(Li) detector placed at 90°. Measured time-of-flight (TOF) spectra of neutrons, $\sigma(E_n,\theta)$, Eγ, nγ-coin. Deduced Q values, levels, L_{2p}, J, π, and isospin.

^{35}Ar Levels

E(level)[†]	J^{π}	L[‡]	Comments
0	$3/2^{+}$	(0)	J^{π}: $3/2^{+}$ mirror ^{35}Cl g.s.
1184.2 *6*			
1749.8 *9*			
2600.8 *15*			J^{π}: 1975Da14 observed L(^{3}He,n)=(0) for a 2.60-MeV level in ^{35}Ar, implying the existence of a $3/2^{+}$ level; possibly the $3/2^{+}$ 2638-keV level in ^{35}Ar.
3195.8 *11*			E(level): deduced by evaluators from the unplaced 1446.0γ.
5537 *25*	($3/2^{+}$)	(0)	T=3/2 J^{π}: $(\pi 1d_{3/2})^2(\nu 1d_{3/2})^1$ configuration formed by the $J^{\pi}=0^{+}$, T=1 $(\pi 1d_{3/2})^2$ diproton transfer from ^{3}He to ^{33}S of $^{32}S\otimes(\nu 1d_{3/2})^1$ configuration. Tentative first T=3/2 state in ^{35}Ar.

[†] From 1975Da14 based on measured Eγ, unless otherwise noted.
[‡] the observed maximum at $\theta=0°$ in $\sigma(E_n,\theta)$ implies L=0.

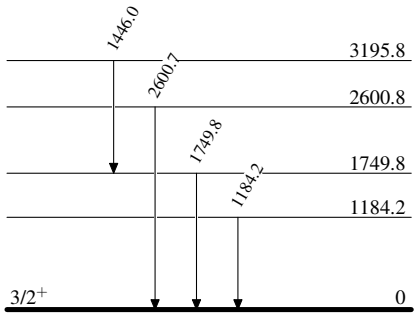
$\gamma(^{35}Ar)$

E$_\gamma$[†]	E$_i$(level)	E$_f$	J^{π}_f	Comments
1184.2	1184.2	0	$3/2^{+}$	
1446.0 *6*	3195.8	1749.8		Unplaced γ in 1975Da14. Evaluators placed it based on the Adopted Levels from ^{16}O(^{24}Mg,αnγ)^{35}Ar (2004Ek01) and ^{24}Mg(^{16}O,αnγ)^{35}Ar (2007De14).
1749.8	1749.8	0	$3/2^{+}$	
2600.7	2600.8	0	$3/2^{+}$	

[†] Eγ values without uncertainties are deduced by evaluators from the level-energy differences from 1975Da14.

^{33}S(^{3}He,nγ) 1975Da14

Level Scheme



$^{35}_{18}Ar_{17}$