

$^{31}\text{P}(^3\text{He,t})\text{E}=25\text{ MeV}$ 2011Pa14

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh		NDS 184,29 (2022)	24-Jun-2022

E=25 MeV ^3He beam was provided by electron cyclotron resonance ion source at MLL in Garching. Target= $26\ \mu\text{g}/\text{cm}^2$ layer of ^{31}P deposited onto a $10\ \mu\text{g}/\text{cm}^2$ carbon foil which had been floated onto an aluminium frame. Reaction products were momentum analyzed by the Q3D spectrograph. Angular distributions were measured at ten angles from 10.0° to 55.1° . FWHM $\approx 12\ \text{keV}$. Analysis of $\sigma(\theta)$ data by finite range coupled-reaction channels code FRESKO. Deduced reaction rates for $^{30}\text{P}(p,\gamma)^{31}\text{S}$ reaction of astrophysical significance.

$J^\pi(^{31}\text{P g.s.})=1/2^+$.

 ^{31}S Levels

E(level) [†]	J^π [‡]	Comments
6136	1	9/2 [#]
6160	1	5/2 [#]
6260	1	1/2 ⁺
6284	1	3/2 ⁺
6329	1	1/2 ⁺
6356	1	3/2 ⁺
6378	1	9/2 [#]
6395	2	
6403	2	
6543	1	J^π : 9/2 ⁻ from $\sigma(\theta)$ fit in figure 2 of 2011Pa14.
6586	1	J^π : 7/2 ⁺ from $\sigma(\theta)$ fit in figure 2 of 2011Pa14.
6637	1	9/2 [#]
6720	1	5/2 [#]
6749	1	3/2 ⁺
6835	1	11/2 [#]
6870	1	11/2 [#]
6936	2	
6958	2	
6971	2	
7030	2	
7049	2	

[†] Uncertainty is statistical only. Systematic uncertainty is 3 keV. 2011Pa14 list recommended values also by considering values from literature.

[‡] As adopted in Table I of 2011Pa14 based on their $\sigma(\theta)$ data and finite range, coupled-channels reaction code FRESKO. Parity given only for $J \leq 3/2$ states, although, shown in Fig. 2 of 2011Pa14. 2011Pa14 caution that for $J > 3/2$, $\sigma(\theta)$ data in ($^3\text{He,t}$) are not sensitive to parity. Not all assignments are matching in Adopted Levels.

[#] Negative parity given in Fig. 2 of 2011Pa14 showing $\sigma(\theta)$ distributions and fit with FRESKO code. However, authors state that for higher ($>3/2$) spins, it is difficult to determine parity due to large number of possible couplings.