

${}^4\text{He}({}^8\text{He}, {}^{12}\text{Be})$ 2017Fr09

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	J. H. Kelley, J. E. Purcell and C. G. Sheu		NP A968, 71 (2017)	1-Jan-2017

2017Fr09: XUNDL dataset Compiled by TUNL, 2018.

The authors studied ${}^{12}\text{Be}$ resonances populated via ${}^8\text{He}$ reactions in a gaseous volume of ${}^4\text{He}$; the elastic reactions and 2n transfer reactions to ${}^6\text{He}+{}^6\text{He}$ were analyzed.

Beams of 20 to 24 MeV ${}^8\text{He}$ ions, from the GANIL/SPIRAL facility entered the ECLAN gas filled reaction chamber, which was maintained at ${}^4\text{He}$ gas pressures ranging from 1.0 to 1.4 bar. The ${}^8\text{He}$ beam energy losses in the entrance windows were around 1.5-2.8 MeV for different beam energy/window thickness configurations. Reaction products were measured using an array of position sensitive Si strip detectors that were arranged in two walls, which were intended to characterize higher energy and lower energy regions of the excitation function. The complete reaction kinematics were analyzed via Thick Target Inverse Kinematics techniques for ${}^4\text{He}+{}^8\text{He}$ and ${}^6\text{He}+{}^6\text{He}$ products.

The excitation function was deduced and relevant resonances in ${}^{12}\text{Be}$ were determined over the ${}^{12}\text{Be}$ $E_x=13.7$ to 16.4 MeV region. The elastic scattering data indicate two broad resonances around $E_x=13$ and 15 MeV, while the 2n transfer reaction indicates a broad $\Gamma \approx 1$ MeV group at around $E_x=14-15$ MeV. Analysis of the angular distributions for the $E_x=14-15$ MeV group suggest $L=4$; hence $J^\pi=4^+$. No narrow resonances with $\Gamma \leq 100$ keV are evident in the data.

 ${}^{12}\text{Be}$ Levels

E(level)	J^π	Γ	L	Comments
$\approx 13 \times 10^3$				Decays via $\alpha+{}^8\text{He}$.
$\approx 14.5 \times 10^3$	4^+	≈ 1 MeV	4	Decays via $\alpha+{}^8\text{He}$ and ${}^6\text{He}+{}^6\text{He}$.