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Determination of $^{13}C(\alpha,\gamma)^{16}O$ Reaction Rate at Stellar Energies Using Sub-Coulomb α-transfer Reaction. BERT GREEN, GRIGORY ROGACHEV, KIRBY KEMPER, BRIAN ROEDER, SIMON BROWN, ERIC JOHNSON, Florida State University, AKRAM MUKHAMEDZHANOV, Texas A & M University — The reaction $^{13}C(\alpha,n)\&^{16}O$ is considered to be the main source of neutron flux for s-process in AGB stars which produces roughly half of all the heavy elements in the universe. The rate of the reaction depends on the structure of the sub-threshold resonances, the most important of which is the 6.36 MeV $1/2^+$ state. The spectroscopic factor of the state was measured using the $^{13}C(^6Li,d)\&^{17}O$ reaction [1]. A surprisingly low value was obtained (S_α=0.011). However, re-analysis of the data by N. Keeley et. al. [2] produced a spectroscopic factor which was over an order of magnitude larger. It is the goal of this experiment to resolve this conflict by using the same $^{13}C(^6Li,d)\&^{17}O$ reaction, but at sub-coulomb energies. A reliable ANC approach can be used at this energy to extract the spectroscopic factor, avoiding uncertainty associated with nuclear potential. [1] S. Kubono et. al., Phys. Ref. Lett. 90 (2003) 062501-1 - 062501-4. [2] N. Keeley, K. W. Kemper, D. T. Khoa, Nuc. Phys. A 726 (2003) 159 - 172.

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