

Abstract Submitted
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The Cluster Structure of ^{18}O E.D. JOHNSON, G.V. ROGACHEV, Florida State University, S. BROWN, The University of Surrey, V.Z. GOLDBERG, Texas A&M University, A. CRISP, Florida State University, C. FU, Texas A&M University, B.W. GREEN, K.W. KEMPER, O. MOMOTYUK, B. ROEDER, Florida State University — Clustering phenomena are known to play an important role in the structure of light nuclei. It can be expected that these remarkable structures in the alpha conjugate systems influence the structure of their neighboring, non-alpha conjugate nuclei, forming molecular type structures [1]. Several experiments have recently indicated that two-center, molecular type structures, with one or two valence neutrons, exist in ^{22}Ne , ^{21}Ne , and ^{10}Be [2,3,4]. Evidently, data on the cluster states in ^{18}O may be very useful for better understanding the phenomenon in question. We performed a detailed study of the cluster structure in ^{18}O by measuring the elastic scattering of ^{14}C on α -particles using the Thick Target Inverse Kinematics technique [5]. The analysis was done using a multi-level, multi-channel R-Matrix approach. The properties of the cluster configurations in ^{18}O will be discussed, along with the influence of the low lying α -cluster states on the astrophysically important $^{14}\text{C}(\alpha,\gamma)$ reaction rate. [1] W. von Oertzen, Eur. Phys. J. A11 (2001) 403. [2] G.V. Rogachev, et al., Phys. Rev. C 64 (2001) 051302. [3] S. Thummerer, et al., J. Phys. G 29 (2003) 509. [4] M. Freer, et al., Phys. Rev. Lett. 96 (2006) 042501. [5] K.P. Artemov, et al., Sov. J. Nucl. Phys. 52 (1990).

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