Abstract Submitted
for the HAW09 Meeting of
The American Physical Society

Study of Density and Structure of Oxygen Isotopes with the Cluster-Orbital Shell Model Approach HIROSHI MASUI, Kitami Institute of Technology, Kitami, 090-8507, Japan, KIYOSHI KATO, Department of Physics, Faculty of Science, Hokkaido University, Sapporo, 060-0810, Japan, KIYOMI IKEDA, The Institute of Physical and Chemical Research (RIKEN), Wako, 351-0198, Japan — We study structure of oxygen isotopes through the analysis of the density and the s-wave contribution. From experiments, the r.m.s.radius of oxygen isotopes has an abrupt increase at ^{23}O from the empirical $A^{1/3}$-low. However, as we have shown with the calculation by using our m-scheme cluster-orbital shell model (COSM) approach, such the abrupt increase can hardly be reproduced only by considering the valence nucleon degree of freedom. In our COSM approach, we construct the core-N Hamiltonian using a semi-microscopic approach by taking into account the Pauli principle for the nucleons in the core. As the nucleon-nucleon potential, we use Volkov No.2 potential. The parameters of the potential are adjusted so as to reproduce the ^{16}O+2n threshold. Using the potential model described above, however, we obtain the over bound nature as the number of valence nucleon increase. Hence, we perform calculations using slightly weaker potential strength for the valence neutrons so as to reproduce the drip-line at ^{24}O. In this study, we discuss the density distributions of the isotopes and the contributions of partial waves especially the s-wave.

Hiroshi Masui
Kitami Institute of Technology, Kitami, 090-8507, Japan

Date submitted: 11 Jul 2009 Electronic form version 1.4