Abstract Submitted
for the HAW09 Meeting of
The American Physical Society

UMOA calculations for ^{16}O, ^{40}Ca, and ^{56}Ni RYOJI OKAMOTO, Kyushu Institute of Technology, SHINICHIRO FUJII, Kyushu University, KENJI SUZUKI, Kyushu Institute of Technology — One of the most fundamental problems in nuclear theory is to describe nuclear structure from the underlying nuclear interactions. The unitary-model-operator approach (UMOA) is an *ab initio* method which can describe the structure of nuclei beyond the p shell using realistic nuclear forces. In the UMOA, the original Hamiltonian is unitarily transformed, and thus three-or-more-body cluster terms are generated even if we employ only the two-body force as the original interaction. In this work, the UMOA is applied to nuclei around ^{16}O, ^{40}Ca, and ^{56}Ni. The ground-state and single-particle energies for hole states of those nuclei including three-body-cluster effects are calculated with realistic nucleon-nucleon interactions. We show that the calculated results are fairly close to the experimental values. The dependence of the results on the two-body interactions and effects of the genuine three-body force are also discussed.

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Date submitted: 05 Aug 2009 Electronic form version 1.4