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Large-scale shell model calculations for structure of Ni and Cu isotopes YUSUKE TSUNODA, TAKAHARU OTSUKA, Department of Physics, University of Tokyo, NORITAKA SHIMIZU, Center for Nuclear Study, University of Tokyo, MICHIO HONMA, Center for Mathematical Sciences, University of Aizu, YUTAKA UTSUNO, Advanced Science Research Center, Japan Atomic Energy Agency — We study nuclear structure of Ni and Cu isotopes, especially neutron-rich ones in the $N \sim 40$ region by Monte Carlo shell model (MCSM) calculations in pfg_9d_5 model space ($0f_{7/2}$, $1p_{3/2}$, $0f_{5/2}$, $1p_{1/2}$, $0g_{9/2}$, $1d_{5/2}$). Effects of excitation across $N = 40$ and other gaps are important to describe properties such as deformation, and we include this effects by using the pfg_9d_5 model space. We can calculate in this large model space without any truncation, as an advantage of MCSM. In the MCSM, a wave function is represented as a linear combination of angular-momentum- and parity-projected deformed Slater determinants. We can study intrinsic shapes of nuclei by using quadrupole deformations of MCSM basis states before projection. In doubly-magic ^{68}Ni, there are oblate and prolate deformed bands as well as the spherical ground state from the calculation. Such shape coexistence can be explained by introducing the mechanism called Type II shell evolution, driven by changes of configurations within the same nucleus mainly due to the tensor force.

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