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Study of nuclei around Z=28 by large-scale shell model calculations

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We study neutron-rich nuclei in the N ~ 40 region by Monte Carlo shell model (MCSM) calculations in pfg_9d_5 shell ($0f_{7/2}$, $1p_{3/2}$, $0f_{5/2}$, $1p_{1/2}$, $0g_{9/2}$, $1d_{5/2}$). In the MCSM, a wave function is represented as a linear combination of angular-momentum- and parity-projected deformed Slater determinants. 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 calculate various observables of nickel and other isotopes, and study intrinsic shapes of nuclei by using quadrupole deformations of MCSM basis states before projection [1]. We discuss magicity and deformation of neutron-rich nuclei such as nickel isotopes.

[1] N. Shimizu, *et al.*, Prog. Theor. Exp. Phys., **2012**, 01A205 (2012).