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Instability of N=Z=28 shell closure against quadruple deformation in ^{56}Ni YOHEI CHIBA, MASAAKI KIMURA, Department of Physics, Hokkaido University, Sapporo 060-0810, Japan — ^{56}Ni is expected to have a doubly closed shell configuration with the magic number N=Z=28 in a simple picture. However, the observed $E(2_1^+)$ and $B(E2)$ suggest the collectivity of ^{56}Ni and weakened N=Z=28 shell closure. Furthermore, in the low-lying states, a super deformed (SD) band with an $(\mathrm{f}_{7/2})^{-4}(\mathrm{p}_{3/2})^4$ configuration is experimentally observed and it shows the existence of the SD shell gap with N=Z=28. Therefore, the detailed study of the low-lying spectrum will provide us important information on the N=Z=28 magic number in the proton-rich nuclei. In this contribution we will discuss the positive-parity excited states of ^{56}Ni and the instability of N=Z=28 shell closure on the basis of the antisymmetrized molecular dynamics calculation. It is shown that the N=Z=28 shell closure is unstable against oblate deformation and it leads to the appearance of low-lying β- and γ-bands. It is also shown that by prolate deformation the spherical N=Z=28 shell gap easily disappears and the SD shell gap appears, which generates SD bands with $(\mathrm{f}_{7/2})^{-\mathrm{m}}(\mathrm{p}_{3/2})^{\mathrm{m}}$ configurations. These two aspects of the N=Z=28 shell closure lead the coexistence of the almost spherical ground band, β - and γ -bands and SD bands within small excitation energies.

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