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A study of the tetrahedrally deformed nuclei by using the quantum number projection method with Gogny interaction SHINGO TAGAMI, YOSHIFUMI R. SHIMIZU, Dept. of Phys., Kyushu Univ., JERZY DUDEK, IPHC, IN2P3- CNRS/Univ. de Strasbourg — Possible existence of the tetrahedrally symmetric nuclei was suggested from mean-field calculations such as the Skyrme (SIII) Hartree-Fock-Bogoliubov (HFB) and the Woods-Saxon Strutinsky methods. Because of large energy gaps of the single particle levels, the tetrahedrally deformed nuclei become stable for the particular particle numbers, i.e., the tetrahedral magic numbers. We have recently performed Gogny (D1S) HFB calculations and obtained the tetrahedrally deformed states for nuclei with such magic numbers. The resultant spectra calculated by the quantum number projection nicely follow the predicted spin-parity combinations by the group theory. One of the important findings is that the tetrahedral energy gain by the projection from the spherical configuration is very large, e.g., about 10MeV for the cases of ^{80,96,110}Zr nuclei, in contrast to the fact that the HFB energy curve is rather shallow. However, the tetrahedral deformation is one of the octupole deformations; new calculations under investigation suggest that the energy gains for the other octupole deformations are of the similar amount for Zr isotopes. We would like to discuss these multiple softness of octupole shape including the tetrahedral deformation.

Shingo Tagami
Dept. of Phys., Kyushu Univ.

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