

Search for tetrahedral shape around 110Zr and possible shell closure at N=70

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Symmetry of tetrahedral shape generates a different degeneracy in single particle levels from the quadrupole deformed shape. The stability of the tetrahedral shape is not established in the atomic nuclei. Neutron-rich nucleus 110Zr, which has the doubly magic numbers of tetrahedral shape, $Z = 40$ and $N = 70$, is one of the candidates to search for the tetrahedral shape. Recently, we discovered the candidate of the tetrahedral shape isomer in 108Zr at RIBF, but the energy of isomeric state has not been determined due to low statistics. We propose beta-gamma and isomer spectroscopies of the isomer in 108Zr, and search for isomer in 110Zr, 110,112Mo with EURICA at RIBF. We will discuss possibilities of tetrahedral shape from the energy and half life of isomeric state and systematic search for long-lived isomer in even-even nuclei.

The stability of the tetrahedral shape competes with the stability of different shapes. So, structures in the vicinity of 108Zr are important, especially the shell evolution at $N=70$, where a shell gap is predicted. The level structure of 110Zr and 112Mo with $N=70$ would be obtained by the isomer and beta-gamma spectroscopy, respectively. The beta-gamma spectroscopy of lighter Zr, Nb, and Mo isotopes is also performed to investigate deformed level structures.

In this workshop, I will show the results of $^{106,108}\text{Zr}$ from the first decay experiment at RIBF and a proposal of the decay experiment with EURICA around 110Zr.

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