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Magnetic moments of microsecond isomeric states at N=59 shape transition region – nuclear alignment in abrasion-fission reaction

Nuclear moments are an important ingredient of our knowledge and understanding of the nuclear structure far from the beta-stability line. The nuclear magnetic moments are very sensitive probes of the single particle structure of the nuclei where the investigated states provide information on valence nucleons occupancy and on configuration mixing. They can serve as a test of the purity of their nuclear wave functions and to the theoretical models predictive power.

After the discovery of a possible large amount of nuclear spin-alignment in projectile fragmentation reactions several experiments were successfully performed in the neutron-rich exotic region. A powerful method to study isomeric states is the well-known Time Dependent Angular Distribution (TDPAD) technique, usually applied to isomers produced by fusion evaporation. Isotopes produced in abrasion-fission reaction at the BigRIPS spectrometer from the RIKEN Nishina center are mainly only accessible in the present facility.

Measurement of nuclear magnetic moments of more exotic isomers requests the knowledge of the behaviour of the spin-alignment arises from abrasion-fission reactions. To bring useful data on the dependence of the amount of the nuclear spin-alignment with respect to the momentum distribution an experiment was performed at RIBF. Reaction mechanism results and magnetic moments of yrast 98mY and 99mZr states will be presented. Rapid onset of collective behaviour in the neutron-rich N=60 region will be discussed.

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