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INVESTIGATION OF THE BETA-DECAY CHAIN 70Fe->70Co->70Ni

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The rapid evolution of shell structure observed in the nuclear region defined by Z<28 and 40< N<50 has been the subject of many experimental and theoretical investigations in the last years. It has been correctly pointed out that the main driving mechanism is the monopole tensor force, responsible for the quenching of the classic magic gap at Z=28 with the filling of the g9/2 neutron orbital [Ots05]. This feature gives rise to interesting changes driven by both particle-hole excitations and Z or N evolution [Tsu14]. An illustrative example is the "doubly-magic" nucleus 68Ni: Two low-lying 0+ states at 1604 keV and 2511 keV, related to oblate and prolate shapes, have been observed [Rec13]. Low-lying deformed 0+ states are also expected to appear in heavier Ni isotopes, though they have not been yet experimentally observed.
The work presented in this contribution aims at investigating the low-lying structure of neutron-rich nuclei with 40< N<50 from beta-delayed gamma spectroscopy. Nuclei in the isotopic chains of Cu, Ni, Co and Fe were produced by in-flight fission of a 345 AMeV 238U stable beam at the Radioactive-Isotope Beam Factory (RIBF) facility at RIKEN, as part of the EURICA campaign [Nis12,Sod13]. The reaction residues were identified using the large-acceptance magnetic spectrometer BigRIPS [Fuk13], and were sent to a beta-decay station consisting of the WAS3ABi active stopper [Nis12] and the EURICA spectrometer [Sod13]. An array of 18 LaBr3 scintillation detectors was also mounted around the WAS3ABi active stopper to perform fast-timing measurements [Pat14]. New beta-decay information and gamma spectroscopy data are available for nearly 20 isotopes.
In particular, results will be shown for the decay chain 70Fe->70Co->70Ni. Based on the observed feeding patterns, new (non-yrast) 0+ and 2+ states in 70Ni will be proposed. As well, the nature of the low-spin beta-decaying isomer in 70Fe will be discussed. The new information will be compared to the neighbour decay chain 68Fe->68Co->68Ni [Fla15]. This will shed light on the evolution of the low-energy structure of the even-even neutron-rich Ni isotopes.

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