# Exciting isomers from the first stopped-beam RISING campaign

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First results will be reported from a major new initiative of experiments, which focus on nuclear structure studies at extreme isospin values by means of isomer spectroscopy. The experiments represent the first part of the so-called stopped-beam campaign within the *Rare Isotopes Investigations at GSI* (RISING) project.

Exotic nuclei were produced using relativistic projectile fragmentation of 500–1000 MeV/u beams of $^{58}$Ni, $^{107}$Ag, and $^{208}$Pb provided by the SIS synchrotron at GSI. The exotic fragments produced were separated and identified event-by-event using the FRagment Separator (FRS). The final reaction products were stopped in layers of plastic, copper, or beryllium at the final focal point of the FRS and viewed by the high-efficiency, high-granularity RISING $\gamma$-ray spectrometer in a compact configuration. This new array comprises 15 germanium cluster detectors from the former EUROBALL array, providing a singles $\gamma$-ray photon efficiency in excess of 15% at 1.3 MeV.

Time-correlated $\gamma$ decays from individually identified nuclear species have been measured, allowing the clean identification of isomeric decays in a wide range of exotic nuclei both at the proton drip-line and in heavy, neutron-rich systems. An overview of the experimental technique will be given, together with the performance of the new array and future research plans for the collaboration.

The presentation will focus on selected highlights from this very successful first campaign. These are studies of mirror symmetry in the $T_z = \pm 1$ system $^{54}_{28}Ni_{26}$ – $^{54}_{26}Fe_{28}$ including isomeric proton radioactivity, the decay properties of a newly identified isomer in the $N = Z = 43$ nucleus $^{86}$Tc dwelling on isospin $T = 1$ and $T = 0$ competition in heavy $N = Z$ nuclei, as well as general aspects of the population of isomeric states in fragmentation reactions.