

Nuclear structure far off stability – RISING campaigns

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Nuclear structure studies at GSI attracted recently an increased interest for the results from the present activities as well as for the future project FAIR. A broad range of physics phenomena can be addressed by high-resolution in-beam γ -ray spectroscopy experiments with radioactive beams offered within the Rare ISotopes INvestigation at GSI (RISING) project. It combined the EUROBALL Ge-Cluster detectors, the MINIBALL Ge detectors, the HECTOR-BaF detectors, and the fragment separator FRS. The secondary beams produced at relativistic energies were used for Coulomb excitation or secondary fragmentation experiments to study projectile like nuclei by measuring de-excitation photons. The first results of the "fast beam campaign" will be discussed in comparison to various shell model calculations including the structure of light Sn isotopes, the discussion of the N=32,34 sub-shell closure based on neutron rich Cr isotopes, and the shell structure in light Ca isotopes.

Alternatively, the relativistic radioactive beams, both in their ground and isomeric states, were implanted and their decay could be investigated. The "stopped beam campaign" has started in October 2005 with a series of g-factor measurements. It continued from February 2006 with the next configuration and the main goal of new isomer identification and angular momentum population in fragmentation reactions.

Future ideas born from the experience with the RISING project will lead to a new instrumentation within NUSTAR at FAIR where a number of projects consider a use of γ -ray detectors. In particular, γ -ray spectroscopy will be a main goal of the HISPEC and DESPEC experiments.