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Coulomb excitation of exotic nuclei at REX-ISOLDE with MINIBALL

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We present in this contribution results obtained at the REX-ISOLDE facility at CERN which now operates successfully for more than 10 years. So far, post-accelerated beams of more than 80 isotopes of elements ranging from Li to Ra have been produced and delivered to experiments. Currently, beam energies up to 3 MeV/u are available.

Most important instrument for the study of exotic nuclei at REX-ISOLDE is the highly efficient MINIBALL spectrometer consisting of 8 triple clusters of six-fold segmented HPGe detectors. The γ-rays are usually measured in coincidence with beam- and target-like nuclei detected by several set-ups of segmented Si detectors.

Many experiments employ "safe" Coulomb excitation as a tool to study collective properties of exotic nuclei through the determination of electromagnetic matrix elements. Other observables, like lifetimes or g factors, are measured by dedicated methods.

One corner stone of the physics programme aims for the study of the evolution of collectivity, in particular near shell closures. Key nuclei and questions investigated at REX-ISOLDE by Coulomb excitation are

- ^{30,32}Mg at the shore of the "island of inversion";
- neutron-rich Cu isotopes, ^{68}Ni, and $^{74-80}$Zn in the region around $Z = 28$ and $N = 40, 50$;
- the onset of deformation around $N = 60$ in ^{94,96}Kr;
- the region around ^{132}Sn including neutron-rich Cd, Xe and Ba isotopes;
- the lack of shell stabilization in the $N = 80$ isotones ^{140}Nd and ^{142}Sm;
- the phenomenon of shape coexistence in light Hg and Po isotopes;
- octupole collectivity in Rn and Ra isotopes, in particular the first measurement of the octupole strength in ^{224}Ra.

The step-wise upgrade of REX-ISOLDE to HIE-ISOLDE has been started already. It aims for a higher beam energy of up to 10 MeV/u, higher beam intensities, and improved beam quality. In parallel, also the instrumentation will be upgraded. These developments will extend the physics programme conducted at ISOLDE to new horizons.

We will present the status of the facility and the research programme as well as discuss the perspectives for future experiments.

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