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New plunger device for MINIBALL

A new plunger device for MINIBALL for lifetime measurements with the recoil distance Doppler-shift (RDDS) method at HIE-ISOLDE was built at the Institute for Nuclear Physics of the University of Cologne. After an in-beam test at the Cologne FN-Tandem accelerator the device has already been installed at MINIBALL to be used for the forthcoming experimental campaign. Here I will present the status of this device including its special features as it can be used both for RDDS measurements and experiments with the usual MINIBALL target holder after an easy removal of the plunger target and degrader holders. Thus no change of the plunger target chamber is required between plunger experiments and other experiments not using the RDDS method.

A high density readout system for TREX at Miniball

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TREX is a versatile silicon detector for measuring transfer and coulex reactions with heavy, neutron-rich beams at CERN/ISOLDE. It is an array of position-sensitive ΔE-detectors and unsegmented E-detectors in a compact setup, allowing for a unique particle identification in 66% of the solid angle. Limiting factors are the energy resolution in the Q-value-spectra the angular resolution for heavy nuclei, emitted around 90° in experiments in inverse kinematics and the electronics noise. Hence, an upgrade of the silicon sensors using 100 μm DSSDs with 100μm pitch requires a high density readout system using an ASIC-based solution with calorimetric performance. The SKIROC2-ASIC offers – despite of its good ENC, the possibility to have an analogue, as well as a fully digitized output and its large dynamic range – with the ability to power-pulse the different ASIC-stages during two bunch crosses, a unique feature for a readout-system of TREX at ISOLDE. On a FEBEX-based data-platform, the integration of the data from the Silicon-array, as well from the surrounding Germanium-array MINBALL, into a common data-stream enables a powerful DAQ-system. Supported by BMBF (05P15WOC1A).

Collectivity in the vicinity of $^{78}$Ni:
Coulomb excitation of neutron-rich Zn at HIE-ISOLDE
Andres Illana Sison and Magda Zielinska for the IS557 collaboration
Nuclei in the vicinity of $^{78}\text{Ni}$ have recently been in focus of many experimental and theoretical investigations. In particular, the neutron-rich Zn isotopes, only two protons above the Ni isotopic chain, are ideally suited to study the evolution of the $Z = 28$ proton shell gap, and the stability of the $N = 50$ neutron shell gap. In the last decade, several experiments were performed to study the collectivity in the even-even Zn isotopes between $N = 40$ and $N = 50$ [1-4], but their results are not consistent; consequently, the evolution of nuclear structure in the neutron-rich Zn nuclei is not fully understood.

The ISOLDE facility finished in 2016 the first phase of a major upgrade in terms of the energy of post-accelerated exotic beams bringing it up from 3 MeV/u to 5.5 MeV/u. The increased beam energy strongly enhances the probability of multi-step Coulomb excitation, giving experimental access to new excited states and bringing in-depth information on their structure.

The very first HIE-ISOLDE beam experiment in October 2015 and its continuation in 2016 have been dedicated to the study of the evolution of the nuclear structure along the zinc isotopic chain. The preliminary results discriminate between the two experimental values of $B(E2; 4^+ \rightarrow 2^+)$ in $^{74}\text{Zn}$, and yield for the first time a $B(E2; 4^+ \rightarrow 2^+)$ value in $^{78}\text{Zn}$.


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**142Xe - Status of the analysis of last years ISS48 experiment**

To study the onset of octupole collectivity and follow the evolution of quadrupole collectivity in the area north-east of the doubly magic nucleus $^{132}\text{Sn}$ a “safe” Coulomb excitation experiment was carried out at HIE-ISOLDE in September 2016. Both beam and target nuclei were measured using C-REX, while the MINIBALL spectrometer was used to detect the emitted gamma rays in coincidence.

The status of the analysis will be presented.