



First EXL experiment with stored radioactive beam: Proton scattering on ^{56}Ni

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EXL (EXotic nuclei studied in Light-ion induced reactions at the NESR storage ring) is a project within NUSTAR [1] at FAIR [2]. It aims for the investigation of light-ion induced direct reactions in inverse kinematics with radioactive ions cooled and stored in the future NESR (New Experimental Storage Ring). A universal detector system will be built around an internal target of the NESR in order to detect the target-like recoils. One of the key interests of EXL is the investigation of reactions at very low momentum transfers where, for example, the nuclear matter distribution, giant monopole resonances (GMR) or Gamow-Teller transitions can be studied [3].

The existing ESR (Experimental Storage Ring) at GSI, together with its internal gas-jet target, provides a unique opportunity to perform this kind of experiments on a smaller scale already today. In the last years we have developed a UHV compatible detector setup based on DSSDs (Double-sided Silicon-Strip Detector) as well as lithium-drifted silicon pad detectors for the target-like recoils [4] and an in-ring detection system for the projectile like heavy ions. With this setup we were able to successfully investigate reactions with a stored radioactive beam for the first time ever. As a part of the first EXL campaign we investigated the reaction $^{56}\text{Ni}(p,p)^{56}\text{Ni}$ by measuring the differential cross section for elastic proton scattering and for determining the nuclear matter distribution of ^{56}Ni . This contribution will present the current status of the project and preliminary results.

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[1] <http://www.fair-center.eu/for-users/experiments/nustar.html>

[2] <http://www.fair-center.eu>

[3] H.H. Gutbrod et al. (Eds.), FAIR Baseline Technical Report, ISBN-3-9811298-0-6, Nov. 2006

[4] B. Streicher et al, Nucl. Instr. And Meth. A 654 (2011) 604

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