

FAKULTÄT für PHYSIK
LUDWIG-MAXIMILIANS-UNIVERSITÄT
MÜNCHEN/GARCHING

PHYSIK-DEPARTMENT
TECHNISCHE UNIVERSITÄT MÜNCHEN
MÜNCHEN/GARCHING

MLL-KOLLOQUIUM

Donnerstag, 12.05.2016, 16¹⁵ Uhr

Hörsaal der LMU in Garching, Am Coulombwall 1
Treffen zum gemeinsamen Kaffee 16 Uhr

Prof. Thorsten Kröll

(Institut f. Kernphysik, TU Darmstadt)

Nuclear reactions in the storage ring ESR with EXL

EXL (EXotic nuclei studied in Light-ion induced reactions) is a project within NUSTAR at FAIR that aims to investigate nuclear structure at storage rings with direct reactions in inverse kinematics. The programme is focussed on reactions with very low momentum transfers. The existing storage ring ESR at GSI provides a unique opportunity to perform part of the programme already now. We successfully performed experiments with stable ^{20}Ne and ^{58}Ni as well as radioactive ^{56}Ni beams. The beams hit the internal gas-jet target (H_2 or ^4He) and the respective target recoils were measured by a newly developed UHV compatible Si detector setup.

The first physics goal was to deduce the nuclear matter radius of ^{56}Ni from elastic proton scattering at 390 MeV/u. This experiment can be considered as the first successfully observed nuclear reaction with a stored radioactive beam ever.

As a proof of principle experiment, a ^{58}Ni beam at 100 MeV/u was impinged on a ^4He target. In inelastic scattering the excitation of the isoscalar giant monopole resonance was observed. During commissioning with a ^{20}Ne beam also a (p,d) transfer reaction was measured.

This first experimental campaign has successfully demonstrated the feasibility of the EXL concept and first physics results are on the way. In my talk, I present the status of the project and discuss the possibilities for an upgraded detector setup covering a larger solid angle and further reaction experiments in the storage rings - CRYRING, ESR and HESR - at FAIR.

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