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Reactions with 9Li at HIE-ISOLDE

The increase of energy of the ISOLDE radioactive beams made possible through the HIE-ISOLDE project has opened new possibilities for reactions studies with exotic beams. A particular challenge is presented by the light nuclei where unbound final states play an important role and the role of the continuum is by now known to be important. Theoretical work on the reaction mechanisms involved aiming for a detailed description of the reaction processes is ongoing and evolves as new experimental data appear.

In particular we are interested in the region of neutron-rich Li-isotopes. 11Li is a famous example of a so-called "nuclear halo", where loosely bound neutrons extends to large distances. However, to understand and aid the theoretical description we require better experimental information on both 11Li itself, but also 10Li and 9Li.

I shall report on results from two experiments performed in the Scattering Experimens Chamber (SEC), both using 9Li as reaccelerated radioactive beam. The first experiment ran November 2016 with a beam energy of 6.8 MeV/u on a deuterated polyethylene target. The second experiment took place in the beginning of November 2018 with a beam energy of 8 MeV/u on a deuterated polyethylene target. Multiple reaction channels are open at these energies, but the major one of interest are the elastic and one-neutron transfer reactions to the isotopes 8Li and 10Li. Particularly interesting are the final channels leading to 10Li and where knowledge on the detailed structure is still lacking in spite of many earlier experiments at widely different beam energies.

The presentation will give an overview of the experimental set-up used and report on the results that have been extracted so far. A comparison will also be given between the current results and the 9Li+2H experiments carried out earlier at REX-ISOLDE at beam energies of 2.3 MeV/u and 2.8 MeV/u.

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