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Reaction experiments approaching the driplines

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Our picture of the structure of nuclei is undergoing dramatic changes when systems far away from the line of stability are studied. Established landmarks in the nuclear landscape like the magic numbers are weakened or displaced, and the nuclear spin-orbit interaction appears to diminish. In the most extreme nuclear systems that can be experimentally studied today, various types of exotic clustering become evident when approaching the drip-lines. Major theoretical efforts are undertaken to understand these nuclei, which partially lie in a domain gradually coming within reach of ab-initio calculations.

Low-energy nuclear reactions constitute an excellent tool for studying these phenomena. The beams from REX-ISOLDE permit few-nucleon transfer experiments in inverse kinematics using an unprecedented range of radioactive species. These reactions are well-proven close to stability with a long-standing knowledge how to disentangle detailed nuclear structure information from the reaction mechanism. This constitutes the starting point when approaching the driplines, with the additional complexity of loosely bound states and/or coupling to the continuum.

REX-ISOLDE is, and will be playing a major role in increasing our experimental knowledge of nuclei in the vicinity of the driplines. The first-generation experiments have only started to show the potential of the device with its associated detector systems and a rich scientific output can be envisaged for the future.

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