

Reactions experiments induced by light exotic nuclei at REX-ISOLDE

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The ability to produce beams of unstable nuclei has changed Nuclear Physics experiments. These beams permit fundamental experiments in order to understand the nuclear structure and processes of astrophysical interest far out from the Valley of Stability.

The REX-ISOLDE facility has allowed us to carry out experiments with exotic nuclei, in an energy range never explored up to date, characterize them and to study the adjacent resonances that can explain how these exotic systems can be formed.

One of the most important and unexpected discoveries of Nuclear Physics during the last decades has been the neutron halo in some nuclei close to or at the drip line. The halo is a threshold phenomenon. A halo state results basically in the presence of bound states close to the continuum. The two neutron halo states situated at the threshold that separates the discreet spectrum from the continuum are maintained bound by forces that in the un-bound, neighbouring nuclei, give rise to resonant states whose break-up gives us information on the final state interactions (FSI).

We began with the characterization of the resonant nucleus ^{10}Li that is one of the binary subsystems of the halo nucleus ^{11}Li and its structure is of capital importance for the theoretical interpretation of the halo. In reactions of ^9Li on a deuterated target we have been able to obtain the excitation energy of ^8Li and to deduce the corresponding spectroscopic factors thanks to the modelling carried out by the group at Seville.

In this presentation we will discuss the experiments we have performed and the results obtained over the last years of REX operation. We will also give an outline for the continuation of these studies taking advantage of the upgrades leading to the HIE-ISOLDE facility.

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