Contribution ID: **64** Type: **Invited**

Theoretical approaches to study reactions with light exotic nuclei

Monday 17 December 2012 13:35 (30 minutes)

The discovery of halo nuclei in the middle eighties marked the beginning of a serial of nuclear and theoretical studies aimed at understanding their peculiar properties, the most remarkable being the presence of one or two weakly-bound nucleons with a high probability of exploring distances well beyond the range of the binding potentials. This gives rise to a dilute density distribution which extends much further than the radius expected for a stable nucleus of the same mass.
The loosely bound nature of these nuclei has also sizable effects in the scattering observables. For example, the elastic scattering of halo nuclei on a heavy target at Coulomb barrier energies was long ago predicted [1] to depart significantly from the Rutherford formula, due to the polarization effect caused by the strong dipole Coulomb interaction. This effect is accompanied by a large breakup probability.
In this presentation, we discuss some recent experiments for several reactions induced by the halo nuclei 6He [2], 11Be [3] and 11Li measured at Louvain-la-Neuve, ISOLDE and TRIUMF, respectively, with emphasis on the theoretical approaches developed to interpret these results. In particular, we discuss recent advances in the Continuum-Discretized Coupled-Channels (CDCC) method required to describe the three-body structure of the 6He and 11Li nuclei and to include the effect of core excitation in the scattering of two-body halo nuclei with well deformed cores, such as 11Be.
We present also the data and theoretical analysis of several transfer reactions triggered by the collisions of 9Li [5] and 8Li [6] on a deuteron target, measured at ISOLDE.

Primary author: MORO, Antonio (University of Seville)

Presenter: MORO, Antonio (University of Seville)

Session Classification: Light nuclei