Contribution ID: **62** Type: **Talk**

Analysis of breakup channel for the 11Li+208Pb reaction at energies around the Coulomb barrier.

Thursday, 29 March 2012 14:35 (20 minutes)

We present new data for the reaction 11Li+208Pb, recently measured at the radioactive nuclear beam facility in TRIUMF (Vancouver, Canada) at energies around the Coulomb barrier (Elab = 24.2 and 29.7 MeV). The halo nucleus of 11Li is composed by a core nucleus of 9Li and two loosely bound neutrons. Due to the weakly bound structure, this nucleus is easily polarizable. Thus, in the presence of a strong electric field this halo nucleus will be distorted and, eventually, it can be broken. This phenomenon, known as dipole Coulomb polarizability, produces a strong reduction of the elastic cross section with respect to the Rutherford prediction.
In addition, this phenomenon gives rises to a large breakup probability of the weakly bound projectile. In this contribution we present preliminary experimental data on the angular and energy distributions of the 9Li fragments.
These distributions are compared with Continuum-Discretized Coupled-Channels calculations, using a simple two-body model (9Li+2n) to describe the bound and continuum states of 11Li. We find that for small scattering angles, the reduction of the elastic cross section with respect to the Rutherford scattering is mostly due to dipole Coulomb couplings to the breakup channels. At these angles, the ratio between the outgoing 9Li and 11Li is also well reproduced by the calculations. At larger angles, the breakup probability is underestimated suggesting the presence of other mechanisms rather than the direct breakup.

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Session Classification: Session 13