Study of ^{9}Be break-up reactions at energies near the Coulomb barrier

R. A. N. Oliveira, G. O. V. de Barros, N. Carlin, R. Liguori Neto, M. M. de Moura, M. G. Munhoz, M. G. del Santo, F. A. Souza, E. M. Szanto, A. Szanto de Toledo, A. A. P. Suaide
Departamento de Física Nuclear, Instituto de Física, Universidade de São Paulo

Interest in nuclear reactions involving weakly bound nuclei has increased in the last few years due to the enhancement of the flux to processes like nucleon transfer and nuclear breakup. Through the study of these processes[1,2,3], it is possible to obtain information about nuclear structure such as one particle states and nuclear cluster structure, as well as information about the influence of continuum states.
With the advent of the exotic beam technology, experiments involving weakly bound nuclei far from the stability region became feasible. These systems have shown peculiar physical properties as halo structure and the low lying continuum states, becoming important to increase our understanding about light nuclear systems.
Within this context, in the last few years our group has been working with weakly bound systems[3,4] to understand the contributions of different reaction mechanisms. In this work, we performed measurements of ^{8}Be production from the ^{9}Be+^{12}C reaction at E_{cm}=12 MeV, which is slightly above the Coulomb Barrier ($V_b \approx$ 10.9 MeV[5,6]) to investigate the breakup channel ^{9}Be $\rightarrow$ ^{8}Be+n. Elastic scattering cross section measurements were performed to study threshold anomalies in optical parameters and transfer contributions.
The experimental elastic scattering data have been compared to the optical model using the São Paulo Potential[7]. Channels couplings to the one-step ^{3}He transfer were included. A good agreement between experimental and calculated cross sections at forward and intermediate angles was obtained, indicating that this process is dominant in this angular region. Preliminary results of ^{8}Be production analysis will be presented.

[1] M. Dasgupta, D. J. Hinde and K. Hagino, Nucl. Phys A 722 (2003) 196c.
[2] L. F. Canto. et al., Phys. Rep. 424 (2006) 1.
[3] F. A. Souza. et al., Nucl. Phys. A 821 (2009) 36.
[4] J. Takahashi. et al., Phys. Rev. Lett. 78 (1997) 30.
[5] J. Carter. et al., Nucl. Phys. A 591 (1995) 349.
[6] A. T. Rudchick et al., Nucl. Phys. A 662 (2000) 44.
[7] L.C. Chamon et al., Phys. Rev. C 66 (2002) 014610.