



Contribution ID: 14

Type: **Physics and astrophysics of neutron deficient nuclei**

alpha-elastic scattering in inverse kinematics for the astrophysical *p*-process

Over the past years, several sensitivity studies [1 - 4] have been performed in order to identify the uncertainties caused by the nuclear input in reaction networks aiming at describing the production of the *p*-nuclei. All studies indicated a strong dependence of the final abundance distribution of the heavy *p*-isotopes on the α -nuclear potential, highlighting the strong need of characterising α -particle induced reactions. Despite the astrophysical *p*-process, α -particle induced reaction cross sections play an essential role under certain *r*-process conditions [5 - 7], and well as in the αp -process [8].

Recent developments in target production [9,10] allow for the measurement of α -particle induced reactions in inverse kinematics, opening a new window in the study of α -nuclear interactions with exotic beams at low energies. Due to the lack of experimental data in the region around the heavy *p*-nuclei, uncertainties in the astrophysical modelling of the *p*-process are still dominated by the α -nuclear potential. The use of radioactive beams in this mass region at energies around the Coulomb barrier surrounded by position-sensitive charged particle detectors provides an unique opportunity to validate models and to reduce the uncertainties in the nuclear potential, and consequently of the astrophysical modelling.

- [1] T. Rauscher, Phys. Rev. C 73, 015804 (2006).
- [2] W. Rapp, J. Görres, M. Wiescher, H. Schatz, and F. Käppeler. Astrophys. J. 653, 474 (2006).
- [3] T. Rauscher, N. Nishimura, R. Hirschi, G. Cescutti, A. St. J. Murphy, and A. Heger, Mon. Not. R. Astron. Soc. 463, 4153 (2016)
- [4] A. Simon, M. Beard, B. S. Meyer, and B. Roach, J. Phys. G: Nucl. Part. Phys. 44, 064006 (2017)
- [5] J. Bliss, A. Arcones, F. Montes, and J. Pereira, J. Phys. G: Nucl. Part. Phys. 44, 054003 (2017)
- [6] P. Mohr, Phys. Rev. C 94, 035801 (2016)
- [7] J. Pereira, and F. Montes, Phys. Rev C 93, 034611 (2016)
- [8] A. M. Long, T. Adachi, M. Beard, {it et al.}, Phys. Rev. C 95, 055803 (2017)
- [9] R. Schierholz, B. Lacroix, V. Godinho, J. Caballero-Hernández, M. Duchamp, and A. Fernández, Nanotechnology 26, 075703 (2015).
- [10] V. Godinho, F. J. Ferrer, B. Fernández, J. Caballero-Hernández, J. Gómez-Camacho, and A. Fernández. ACS Omega 2016, 1 (6), 1229 (2016).

Author: GALAVIZ REDONDO, Daniel (LIP Laboratorio de Instrumentacao e Fisica Experimental de Part)

Presenter: GALAVIZ REDONDO, Daniel (LIP Laboratorio de Instrumentacao e Fisica Experimental de Part)