

Nuclear Reactions

Adelaide Pedro de Jesus

This group has been involved in the study of proton-induced nuclear reactions with the objectives to obtain cross sections of nuclear reactions relevant to nuclear astrophysics and to extend analytical capabilities to light elements.

So far, the experimental work has relied upon ITN – Ion Beam Laboratory, based on a 2.5MV Van de Graaff accelerator. This facility has allowed the development of an accurate method to measure in an absolute way cross sections of relevant nuclear reactions. Also for the applied point of view an effort has been done to complement the already installed PIXE facility by developing a set-up of PIGE analysis for light elements.

In order to proceed with experimental work related to astrophysically relevant nuclear reactions, the group has joined LUNA (Laboratory for Underground Nuclear Astrophysics) collaboration and also

established collaboration with Prof. Claus Rolfs group of Bochum University. Work under LUNA collaboration has been centred on the study of the reactions $^{14}\text{N}(p, \alpha)^{15}\text{O}$ and in Bochum the work is related to the study of electron shielding effects on nuclear reaction cross sections at very low energies. Target preparation and stoichiometry analysis by ERD, RBS, PIGE and NRA, has been done at ITN.

In the short term the work to develop a calibrated PIGE set-up will be concluded, opening new perspectives in applied work for Environment, Materials and Health Sciences and Geology. Also, work under LUNA collaboration will proceed with the study of relevant reactions of the p-p chain and CNO cycles. This collaboration will imply some experimental work at ITN, namely for target preparation and stoichiometry analysis by ion beam techniques and cross section measurements for normalisation of LUNA measurements

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Research Team

Researchers

- A. P. . JESUS, Full Professor (FCT/UNL),
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- J.P. RIBEIRO, Associate Professor (FCUL)

Students

- J. CRUZ, PhD Student, (FCT/UNL)
- R. MATEUS, PhD Student, FCT grant
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