

A Target Design Laboratory for Nuclear Astrophysics Experiments

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Nuclear astrophysics is at the frontier between nuclear physics and astrophysics aiming to understand the creation of the elements in the universe. Nuclear reaction networks require the input from nuclear cross sections, which have to be determined experimentally by mimicking conditions similar to the ones encountered in the stars that is experiments in the low energy spectrum (generally below 10 MeV).

Although not generally at the center of a nuclear reaction experiment, target properties and characteristics are crucial for the ultimate success of any cross section measurement. With the goal of interacting with the end-user, aiming at the best possible reaction target production, we created the Target Design Laboratory (TDL) at LIP-Lisbon in Portugal. We have specialised ourselves in the production and characterisation of thin films with thicknesses in the order of hundreds of micrograms cm^{-2} , which are very suitable for many low-energy cross-section measurements.

In this contribution, I will present the current equipment available for target production at the TDL group; introduce the various techniques we have in-house and close-by for thickness and homogeneity characterization, and will discuss some examples of targets produced in the recent years for low-energy reaction experiments, with strong focus on nuclear astrophysics studies.

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