

Determination of $^{14}\text{N}(n,p)^{14}\text{C}$ MACS using activation measurements and AMS *

Goula Ioanna^{(1),(2)} on behalf of the n_TOF collaboration

⁽¹⁾*University of Campania L. Vanvitelli, Caserta, Italy*

⁽²⁾*INFN - Istituto Nazionale di Fisica Nucleare, Italy*

ioanna.goula@unicampania.it

Neutron capture cross sections are essential inputs for modeling stellar nucleosynthesis, particularly for the slow neutron-capture (s-process.) The $^{14}\text{N}(n,p)^{14}\text{C}$ reaction is of particular interest, as it acts both as a neutron poison and as a source of delayed neutrons through subsequent reaction chains. An accurate determination of its Maxwellian Average Cross Section (MACS) is therefore essential for reliable astrophysical models. However, the two most recent measurements exhibit non-negligible discrepancies [1,2] and the precision achievable with time-of-flight measurements remains limited, thus motivating the development of complementary approaches.

In this contribution, we present a new measurement, combining neutron activation and Accelerator Mass Spectrometry (AMS) technique to investigate the $^{14}\text{N}(n,p)^{14}\text{C}$ cross section with high sensitivity and accuracy [3]. Several nitrogen-rich target materials have been irradiated with quasi-Maxwellian neutron spectra at the n_TOF NEAR station, using different filter configurations to probe the energy range relevant to s-process nucleosynthesis. Complementary irradiations at LNL-INFN [4] are planned to further validate and benchmark the method. Following irradiation, the freshly produced ^{14}C atoms will be quantified at the CIRCE AMS facility [5], allowing extraction of the corresponding MACS values.

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