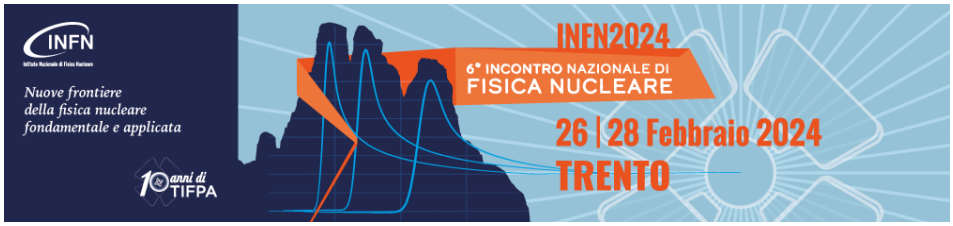

Contribution ID: **88** Type: **Oral**

A new underground measurement of the ^{14}N(p,γ)^{15}O reaction at Bellotti Ion Beam Facility

Monday, 26 February 2024 11:20 (20 minutes)

An accurate understanding of the slowest reaction of the CNO cycle, the ^{14}N(p,γ)^{15}O, is essential for estimating the lifetimes of massive stars and globular clusters. Additionally, it plays a crucial role in determining the CNO neutrino flux emitted by the Sun. Despite the significant efforts over the years, including pioneering underground measurements made by the LUNA collaboration, this reaction remains the predominant source of uncertainty when assessing the solar chemical composition.

As a pilot project for the LNGS Bellotti Ion Beam Facility, the LUNA collaboration is conducting a ^{14}N(p,γ)^{15}O experiment focused on measuring the excitation function and angular distribution using improved solid targets, optimized to limit the beam-induced background contribution. An excellent sensitivity is achieved in synergy with the high beam current provided by the new 3.5 MV accelerator in its deep-underground location.

The aim of the measurement is to provide high-quality differential cross section data in the energy range from 0.3 to 1.5 MeV, which will give new insights and strengthen the knowledge of this key astrophysical reaction. Preliminary results of the ^{14}N(p,γ)^{15}O excitation function and angular distribution will be presented, including novel data for the least-known weaker transitions.

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Session Classification: Nuclear Astrophysics II