Contribution ID: **101** Type: **Poster**

Measuring $^{12}C(\alpha,\gamma)^{16} with ERNA: improvements and perspectives

Tuesday 6 September 2022 20:20 (2 minutes)

$^{12}C(\alpha,\gamma)^{16}O$ has been, and still is, one of the central topic in nuclear astrophysics.\\
Reason for this is that stellar models are very sensitive to the ratio $^{12}C/^{16}O$ produced by the helium buring stage. Knowing the value of the $^{12}C(\alpha,\gamma)^{16}O$ S-factor at the energy of astrophysical interest ($E_0 \sim 300$ keV) to a precision better than 10\% would constrain our prediction on the isotopic aboundances and the fate of a star at the end of its evolution.\\
The expected cross section at E_0 ($\sim 10^{-17}$ b) makes the direct measurement unfeasible and the complex ^{16}O energy levels structure require high precision measurement at higher energies to improve extrapolations of the S-factor.\\
Recent developments have improved the ERNA separator installed at the Tandem laboratory of the University of Campania, Caserta that is now capable of measuring the $^{12}C(\alpha,\gamma)^{16}O$ cross section and its gamma emission angular distribution down to 1.0 MeV. \\
In this contribution the commissioning of ERNA for the $^{12}C(\alpha,\gamma)^{16}O$ and perspective on the measurement campaign will be shown.

Authors: Dr FORMICOLA, Alba (Istituto Nazionale di Fisica Nucleare); DI LEVA, Antonino (INFN - National Institute for Nuclear Physics); SANTONASTASO, Claudio; RAPAGNANI, David (University of Naples "Federico II"); Dr PORZIO, Giuseppe (Università della Campania "Luigi Vanvitelli"); GARCIA DUARTE, Jeremias (INFN - National Institute for Nuclear Physics); GIALANELLA, Lucio (University of Naples 2 and INFN - National Institute for Nuclear Physics); DE CESARE, Mario (Italian Aerospace Research Centre - CIRA); Dr ROMOLI, Mauro (Istituto Nazionale di Fisica Nucleare); BUOMPANE, Raffaele

Presenter: SANTONASTASO, Claudio

Session Classification: Poster session