Contribution ID: **116** Type: **Poster**

Investigation of the ^{7}Li(p,n)^{7}Be neutron fields at high energies

Tuesday 6 September 2022 18:04 (2 minutes)

The neutron activation method is well-suited to investigate neutron-capture cross sections relevant for the main s-process component. Neutrons can be produced via the ^{7}Li(p,n) reaction with proton energies of 1912 keV at e.g. Van de Graaf accelerators, which results in a Maxwellian spectrum of neutrons corresponding to a temperature of k_BT = 25 keV. This mimicks the s-process scenario in low-mass asymptotic giant branch (AGB) stars. However, the weak s-process takes place in massive stars at temperatures between 25 and 90 keV. Neutron spectra corresponding to a Maxwell-Boltzmann distribution with k_BT > 25 keV cannot be produced by the ^{7}Li(p,n) reaction. Simulations using the PINO [1] code suggest that a Maxwellian spectrum for higher energies can be produced by a linear combination of different neutron spectra. The resulting spectrum averaged cross sections can be combined to e.g. k_BT = 90 keV Maxwellian Averaged Cross Section (MACS). To validate the PINO code at proton energies $E_p \neq$ 1912 keV, measurements were carried out at the PTB Ion Accelerator Facility (PIAF) at the Physikalisch-Technische Bundesanstalt in Braunschweig, Germany. The neutron fields were measured using a pulsed proton beam and three 6Li-glass scintillation detectors mounted at different angles. The neutron energy was determined by time-of-flight (TOF).

[1] R. Reifarth et. al., Nuclear Instruments and Methods in Physics Research A 608, 139 (2009)

Authors: BRUECKNER, Benjamin (Goethe University Frankfurt); KURTULGIL, Cem Deniz (Goethe University Frankfurt (DE)); LANGER, Christoph (FH Aachen, GSI); AL-KHASAWNEH, Kafa (Goethe University Frankfurt); GOEBEL, Kathrin (Goethe University Frankfurt (DE), FAIR); WEIGAND, Mario (Goethe University Frankfurt); REICH, Markus (Goethe University Frankfurt); VOLKNANDT, Meiko (Goethe University Frankfurt); WIESCHER, Michael (University of Notre Dame); ERBACHER, Philipp (Goethe University Frankfurt); NOLTE, Ralf Heinrich (Physikalisch-Technische Bundesanstalt (DE)); REIFARTH, Rene (Goethe University Frankfurt (DE)); HEFTRICH, Tanja (Johann-Wolfgang-Goethe Univ. (DE))

Presenter: BRUECKNER, Benjamin (Goethe University Frankfurt)

Session Classification: Poster session