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Development of a 90keV maxwellian neutron spectrum for nuclear astrophysics at HiSPANoS@CNA

The Maxwellian Averaged Cross Section (MACS) is a very relevant quantity regarding stellar nucleosynthesis. To consider all possible scenarios, the stellar temperatures of interest are within the range of $kT = 5$ keV up to 120 keV. Traditionally, the standard value taken has a reference has been 30 keV, because the equivalent neutron distribution can be directly produced using the reaction ${}^7\text{Li}(n, p)$ with 1912 keV protons. One particular case of high interest to study the weak s-process is $kT = 90$ keV.

In this work, we have tested for the first time a new technique proposed by [Reifarth:2018] to produce a 90 keV distribution using a combination of several proton beam energies (and, therefore, neutron distributions). For this matter, and since the neutron capture cross section of ${}^{197}\text{Au}$ is a standard above 2.5 keV, a series of gold neutron activation measurements have been performed at the HiSPANoS facility at CNA (Seville, Spain). The results of the measurement and the possibilities that this new technique offers to the astrophysical community will be presented.

[Reifarth:2018] Reifarth R. et al., *The European Physical Journal Plus*, 133(10), 424 (2018).

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