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The study of the ^{7}Li(γ,α)^{3}H reaction at energies below 6 MeV at HIγS

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The abundances of the light elements can be spectroscopically determined by observing the low-metallicity stars. Usually, those measurements are in agreement with the Big Bang Nucleosynthesis predictions. Particularly, the Li-7 measured abundance is 3-4 times lower than expected, discrepancy known as the "cosmological Li problem". The reaction ^{3}H(α,γ)^{7}Li contributes to the production of Li-7 in Universe and can be studied through its inverse reaction, according to the reciprocity theorem. In consequence, the Li-7 photodisintegration has been measured by our team in 2017 at the High Intensity γ-ray Source (HIγS) Laboratory of Duke University (USA) using a silicon detector array (SIDAR) to observe the coincidences between the alpha particles and the tritons. The considered energies of the gamma beam have been between 4.4 and 10 MeV, but below 6 MeV the coincidences have been observed only in the thinner detectors. In 2023, a new similar experimental campaign, with an improved set-up, took place at HIγS for gamma-beam energies between 3.7 and 6 MeV. The coincidences have been clearly separated and the preliminary astrophysical S-factor of the direct ^{3}H(α,γ)^{7}Li reaction has been successfully extracted.
The set-up and the preliminary results of the experimental campaign performed at HIγS in 2023 will be presented.

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