Study of the ^{2}H(p,γ)^{3}He cross section at $E_{\mathrm{p}} = 400\,\mathrm{keV} - 800\,\mathrm{keV}$

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The production of deuterium marks a crucial step for the nucleosynthesis of light elements during the Big Bang Nucleosynthesis (BBN). The precision on the deuterium abundance is currently limited by the uncertainty of its destruction via the ^{2}H(p,γ)^{3}He - reaction . Furthermore, in the considered energy range there is only one experimental data set available , which was conducted in 1962.

The present work reports on a recently performed experimental study on the ^{2}H(p,γ)^{3}He cross section at energies of $E_{\mathrm{p}} = 400 - 800\,\mathrm{keV}$. This range snuggles into the energy window which is most important for the BBN. For this purpose, a proton beam was provided by the 3 MV Tandetron accelerator at the Helmholtz - Zentrum Dresden - Rossendorf in January 2018, where a solid target experiment with deuterated titanium samples was performed. The emitted γ - rays were detected by two high - purity germanium detectors. The amount of target atoms was determined in situ by the Nuclear Reaction Analysis using the ^{2}H(^{3}He,p)^{4}He - reaction and the Elastic Recoil Detection Analysis.