Contribution ID: **593** Type: **Contributed Poster Presentation**

The baryon density of the Universe from improved rates of deuterium burning

The comparison of deuterium abundance observed in selected astronomical site and the computed abundance foreseen by the Big Bang Nucleosynthesis (BBN) theory is a powerful tool to derive the baryon density of universe in the first minutes of Universe. The LUNA collaboration has recently completed the study of the D(p,γ)^{3}He reaction at BBN energies with unprecedented precision, providing the baryon density Ω_b(BBN) of universe at percent level, in good agreement with the Ω_b(CMB) value unfolded from CMB data. The new data also provide a stringent constrain on the possible existence of "dark radiation", i.e. relativistic particles not foreseen in the standard model, such as sterile neutrinos or hot axions. To further improve the accuracy of these results it is in program the accurate study of the d(d,p)^{3}H and d(d,n)^{3}He processes at BBN energies.
In this talk the consequences of the recent D(p,γ)^{3}He experiment in Cosmology, particle physics and theoretical nuclear physics are discussed [1,2], as well as the impact of the forthcoming study of the deuterium-burning d(d,p)^{3}H and d(d,n)^{3}He reactions.

[1] V. Mossa et al., Nature **587**, 210 (2020).
[2] K. Stockel. et al., Phys. Rev. C **110**, L032801 (2024).

Primary author: GUSTAVINO, carlo (INFN)

Presenter: GUSTAVINO, carlo (INFN)

Session Classification: Poster Session

Track Classification: Nuclear Astrophysics