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Recent THM investigation of the ${}^7\text{Be}(n,\alpha){}^4\text{He}$ reaction relevant for cosmology

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The role of the unstable ${}^7\text{Be}$ during the early epoch of the Big Bang Nucleosynthesis is currently matter of study in view of the long-standing ${}^7\text{Li}$ cosmological problem [1]. Recently, the Trojan Horse Method (THM) [2] have been applied for measuring the cross section of the (n,α) reaction channel on ${}^7\text{Be}$ by means of charge-symmetry hypothesis applied to the previous ${}^7\text{Li}(p,\alpha){}^4\text{He}$ THM data corrected for Coulomb effects. The deduced ${}^7\text{Be}(n,\alpha){}^4\text{He}$ data overlap with the Big Bang nucleosynthesis energies and the deduced reaction rate allows us to evaluate the corresponding cosmological implications [3]. Beside this, a devoted experiment has been also performed in order to study the ${}^7\text{Be}(n,\alpha){}^4\text{He}$ via the THM application to the ${}^7\text{Be}$ -deuteron quasi-free interaction with the aim of studying the ${}^7\text{Be}$ -n cross section in a large energy range overlapping with the one of interest for BBN. The detailed analysis will be shown together with the preliminary results about the ${}^7\text{Be}(n,\alpha){}^4\text{He}$ cross section measurement.

[1] C. Bertulani & T. Kajino, Progress in Particle and Nuclear Physics 89, 56 (2016)

[2] R.E. Tribble et al., Report on Progress Physics 77, 106901 (2014)

[3] L. Lamia et al., The Astrophysical Journal 850, 175 (2017)

Selected session

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