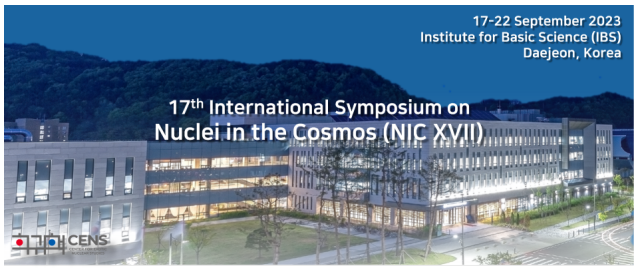

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Astrophysically relevant Neutron induced reactions studied via THM

Tuesday, September 19, 2023 5:40 PM (5 minutes)

Neutron induced reactions on unstable nuclei play a significant role in the nucleosynthesis of the elements in the cosmos. Their interest range from the primordial processes occurred during the Big Bang Nucleosynthesis up to the "stellar cauldrons"where neutron capture reactions build up heavy elements. In the last years, several efforts have been made to investigate the possibility of applying the Trojan Horse Method (THM) to neutron induced reactions mostly by using deuteron as "TH-nucleus". Here, the main advantages of using THM will be given together with a more focused discussion on the 7Be(n,alpha)4He "study case"and the 14N(n,p)14C reaction. The former reaction was studied via the THM application to the quasi-free 2H(7Be,aa)p reaction and it represents the extension of the method to neutron-induced reactions in which an unstable beam is present. The 14N(n,p)14C reaction was studied via the 2H(14N,p14C)p experiment performed at INFN-LNS via a 50 MeV 14N beam provided by the INFN-LNS TANDEM accelerator. Preliminary results shows the population of intermediate 15N excited states at astrophysical energies. These applications open new frontiers in the application of the method (i.e. the study of 7Be+d or 11C+alpha reactions) extending its range of applicability for contributing to astrophysically relevant problems.

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