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Trojan Horse Method for n-induced reaction investigations at astrophysical energies

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Neutron induced reactions play a significant role in the nucleosynthesis of the elements in the cosmos. Its interest ranges from the primordial processes occurred during the Big Bang Nucleosynthesis up to the “stellar cauldrons” where neutron capture reactions could take place via the s-process or the r-process. 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 recent $7\text{Be}(n,\alpha)4\text{He}$ and the $14\text{N}(n,p)14\text{C}$ reactions. The former reaction was studied via the THM application to the quasi-free $2\text{H}(7\text{Be},\alpha\alpha)p$ reaction and it represents the extension of the method to neutron-induced reactions in which an unstable beam is present. The $14\text{N}(n,p)14\text{C}$ reaction was studied via the $2\text{H}(14\text{N},p14\text{C})p$ experiment performed at INFN-LNS via a 50 MeV 14N beam provided by the TANDEM accelerator. The preliminary data analysis will be also shown.

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