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Measurements of the $^{10}\text{B}(p,\alpha)^7\text{Be}$ cross section at astrophysical energies using the Trojan Horse Method

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For nucleosynthesis calculations precise reaction rates should be known at energies close to the Gamow peak. Accurate measurements of nuclear reactions performed at these energies [1-5] shows an unexpected enhancement of the cross section at the lowest measurable energies that is attributed to the presence of atomic electrons in the target. In order to observe the bare nuclear cross section, it is possible to perform experiments where the cross section is measured indirectly, as for example with the Trojan Horse Method (THM). In this method the electron screening effect is neglected since the measurements take place at much higher energies [6].

The THM has been applied to the quasifree $^2\text{H}(^{10}\text{B},\alpha)^7\text{Be}n$ reaction induced at a boron-beam energy of 28 MeV. The astrophysical S-factor of the $^{10}\text{B}(p,\alpha)^7\text{Be}$ reaction was measured in a wide energy range, from 5 keV to 2.5 MeV. In this experiment has been achieved a much better energy resolution as compared to the previous one [7] allowing the significantly better separation of the 8.654 MeV and 8.699 MeV ^{11}C levels. Since the 8.699 MeV resonance lies at the Gamow peak energy for the $^{10}\text{B}(p,\alpha)^7\text{Be}$ reaction, the proper subtraction of events belonging to the subthreshold level at the 8.654 MeV is necessary for accurate determination of the astrophysical S-factor and so, electron screening potential.

- [1] C. Rolfs, W. Rodney, *Cauldrons in the Cosmos*, The University of Chicago, 561 (1988);
- [2] H. Assenbaum et al., *Z. Phys. A* 327, 461 (1987);
- [3] G. Fiorentini et al., *Z. Phys. A* 350, 289 (1995);
- [4] F. Strieder et al., *Naturwissenschaften* 88, 461 (2001);
- [5] E. G. Adelberger et al., *Rev. Mod. Phys.* 195, 83 (2011);
- [6] S. Typel, H. H. Wolter, *Few-Body Systems* 29, 75 (2000);
- [7] C. Spitaleri et al., *Phys. Rev. C* 90, 035801 (2014).

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