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Abstract = Authors: A. Lavagno, G. Gervino

Title: High Efficiency Large Volume Multiparametric Neutron Detector for Nuclear Physics and Nuclear Astrophysics Measurements

Abstract: Monitoring neutron emission with efficient detectors is the most straightforward way to study physics problems such as fission of heavy nuclei, where neutrons are preferentially emitted because of the Coulomb barrier, and the (α, n) reactions (among them we mention $^{13}\text{C}(\alpha, n)^{16}\text{O}$ and $^{26}\text{Ne}(\alpha, n)^{25}\text{Mg}$ that are essential to understand the evolution of AGB (asymptotic giant branch) stars and the production of elements heavier than Fe via slow neutron capture s-process). A large volume (more than 5 l) neutron detector has been realized by organic liquid scintillator: the detector shows a very good performance for high efficiency measurements at low and very low neutron rate in the 0.03-10 MeV energy range. gamma-n discrimination has been jointly performed by standard pulse shape discrimination and the digital charge comparison method, the results obtained by the two techniques are presented and discussed.