



Measurement of the hadronic interaction inside the plastic scintillators

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Abstract

Scintillation detectors are widely used in the experimental setup for the detection of charged particles. These detectors are able to measure the energy and time-of-flight of the charged particles. Also, they can be used to identify the detected particle. The probability of hadronic interaction between the detected particle and the nuclei of the scintillator atoms is one important issue that must be considered in the analysis of the detectors output. The hadronic interaction causes particles the deposit only a part of their energy inside the detector. In this case, particle will appear in the tail of energy spectrum and is mixed with the background events. Therefore, the measured cross section, which is calculated using the number of particles that deposit their full energy in the detector will be underestimated and one should correct the cross section for the lost events. The percentage of incident particles for which the hadronic interaction occurs is determined by different methods. In this paper, using two different methods, Monte-Carlo simulation and experimental data for several different channels in the proton-deuteron and deuteron-deuteron scattering at intermediate energy are introduced. The obtained results from the two methods are consistent with each other.

Keywords: hadronic interaction, elastic scattering , three-body break-up channel scintillators, time-of-flight

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