

NeuLAND MRPC-based detector prototypes tested with fast neutrons

Wednesday, 10 February 2010 17:00 (2 hours)

A detector for momentum measurement of high-energy neutrons in the energy range 0.2 - 1 GeV is being developed for the R3B (Reactions with Relativistic Radioactive Beams) experiment at FAIR. Based on the running LAND detector at GSI, NeuLAND will consist of a layered structure made of iron converters, to convert neutrons mainly to protons, and multigap resistive plate chamber (MRPC) detectors in order to detect the secondary charged particles. The excellent time resolution of the MRPC units will allow for a very good time-of-flight resolution of NeuLAND, meeting the design goal of $\sigma_{\text{t}} < 100\text{ps}$. The full NeuLAND detector will consist of about 60 iterations of the basic structure (converter + MRPC), leading to close to 100% detection efficiency for neutrons with energy higher than 200 MeV.

Prototypes built at GSI and FZD were tested using MIPs at the ELBE electron beam facility at FZD. Here we present recent results from a first irradiation of the prototypes with fast neutrons. The TSL Uppsala* monoenergetic neutron beam of $E_n = 175\text{ MeV}$ is well-suited for such a study. This data will serve both for the validation of the basic detection scheme and as important input to refine GEANT4 and FLUKA simulations of the final detector.

Primary author: CAESAR, Christoph (GSI Darmstadt)

Presenter: CAESAR, Christoph (GSI Darmstadt)

Session Classification: Poster session