

High time resolution design of iTOF-mrpc detector in CEE experiment

Wednesday 26 April 2023 17:05 (25 minutes)

The external-target experiment (CEE) is the first large-scale nuclear physics experimental device by China to operate in the fixed-target mode with an energy of ~ 1 GeV. The purpose of the CEE is to study the properties of dense nuclear matter. CEE uses a multi-gap resistive plate chamber (MRPC) as its internal time-of-flight (iTOF) detector for the identification of final-state particles. An iTOF-MRPC prototype with 24 gaps was designed to meet the requirements of CEE, and the readout electronics of the prototype use the FPGA-based time digitization technology. Using cosmic ray tests, the time resolution of the iTOF prototype was found to be approximately 30 ps. In order to further understand how to improve the time resolution of MRPC, ANSYS HFSS was used to simulate the signal transmission process in MRPC. The main factors affecting the timing performance of the MRPC and, accordingly, the optimization scheme are presented.

Theory / experiment

Experiment

Group or collaboration name

CEE

Primary author: Dr HU, Dongdong (University of Science and Technology of China)

Presenter: Dr HU, Dongdong (University of Science and Technology of China)

Session Classification: Parallel Session B

Track Classification: Experimental techniques and future programs