

Abstract Submitted
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Time of Flight Detector Development for Future Heavy Ion Experiments¹ HANNAH HAMILTON, Abilene Christian University, PHENIX COLLABORATION — Experiments at Brookhaven National Laboratory's Relativistic Heavy Ion Collider discovered the quark gluon plasma (QGP) through the collisions of heavy ions. To further study the the QGP, upgraded detectors may rely on time of flight for particle identification. New techniques are capable of reducing the timing resolution from 100 ps to 10 ps. This improvement will provide better particle identification. Two such detectors that are being considered are multi-gap resistive plate chambers (mRPCs) and microchannel plate photomultiplier tubes (MCP-PMTs). Prototypes of both detectors have been assembled and are ready for detailed testing. In order to test the prototypes, a cosmic test stand has been assembled. To meet the timing resolution goal of 10ps, many details need to be taken into account, including the precise path of a cosmic muon, and the timing resolution of readout electronics. Multiple fast ADCs were considered for this high precision timing study. The chosen ADC was the DRS4 version 5 evaluation board, which has exhibited resolutions as good as 3ps. The status of this research and development project will be presented along with studies of the timing resolution of different electronics that were considered.

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