

A Design for a Novel TOF Detector with 10 picosecond Resolution

Recent developments in Time of Flight Detector (TOF) technology have made it possible to achieve timing resolutions of close to 10 ps. Much more development needs to be done, particularly in producing electronics with picosecond resolutions at reasonable cost. We present recent R&D studies at Brookhaven National Lab which study the feasibility of building a detector using micro-channel plate detectors and waveform digitizers, over a relatively small area. With such excellent timing resolution, it would be possible to upgrade PHENIX with a TOF detector covering the full azimuth over moderately forward pseudorapities ($0.8 < |\eta| < 1.5$), thus increasing the coverage for PID by a factor of 16. We will also present the wealth of new measurements which would be enabled by such a new detector for PHENIX.

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