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Development of a 10 Picosecond Resolution Time-of-flight Detector

At the University of Texas, Arlington, we have been leading the development of an ultra-precise timing detector as part of a proposed far forward proton detector system upstream and downstream of the ATLAS detector to aid in new particle searches at the Large Hadron Collider. This timing detector would have unprecedented accuracy on the 10 ps scale, providing rejection against the combinatoric background arising from the overlap of several proton-proton collisions in the same bunch crossing. We give an overview of the Cherenkov-based fast timing detector, describe the micro-channel plate photomultipliers under development, and present results from beam and laser tests.

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