

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 the ATLAS Forward Proton detector (AFP), which is part of the recently approved ATLAS Phase I upgrade.

The AFP system incorporates position and timing detectors into specialized movable beam pipe sections upstream and downstream from ATLAS, and along with the LHC magnets forms a set of high resolution momentum spectrometers, enhancing the physics capabilities of ATLAS. This timing detector has 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.

Primary author: HOWLEY, Ian (UT-Arlington)

Presenter: HOWLEY, Ian (UT-Arlington)