

Radiation Hard Prototype for ATLAS ZDC Upgrade

Increases in luminosity and collision energy at the LHC challenge the radiation hardness of detectors located along the beamline. This problem is especially acute for the ATLAS Zero Degree Calorimeters (ZDCs), which are exposed to about 10^{10} rad/yr, rendering the current version of the detector unusable during p+p running. To address this shortcoming and allow for important triggers and access to interesting low-x physics, we have designed a prototype that replaces quartz radiator material with a circulating, liquid hydrocarbon, as well as a new radiator geometry that orients the radiator gaps and tungsten absorber plates along the Cherenkov angle of normally incident particles. Design considerations, results from prototype beam tests at the SPS, and comparisons to GEANT simulation will be presented. The poster will also discuss plans for a material test that will take place at the ZDC's nominal location in ATLAS during the 2017 p+p run, allowing for important radiation hardness measurements of candidate materials for liquid radiator, reflectors and quartz fibers.

Preferred Track

Future Experimental Facilities, Upgrades, and Instrumentation

Collaboration

ATLAS

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