

Developments for the ATLAS Tile Hadronic Calorimeter for the Phase II Upgrade

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TileCal is a hadron calorimeter located in the central region of the ATLAS experiment at the Large Hadron Collider. It is comprised of iron absorbers and scintillator tiles that produce light when charged particles cross the tiles, which is then collected by photomultiplier tubes. The signals from the photomultiplier tubes are digitized in sync with the LHC clock and transmitted to the Read-Out Drivers (RODs) at a rate of 100 kHz. The ROD is the core component of the back-end electronics, responsible for tasks such as energy and time reconstruction, trigger and data synchronization, and data compression. The IFIC-TileCal group was involved in the design, production, installation, and maintenance of the ROD system.

For the upcoming High-Luminosity Large Hadron Collider experiments, the ATLAS trigger and readout architecture has been altered. TileCal will read out signals for every bunch crossing before any trigger selection is applied, leading to a total bandwidth of 40 Tbps. These data will be processed by the PreProcessors (PPr), located in the off-detector electronics. The PPr modules will handle the interface with the Level 0 trigger and overall DAQ and detector control systems. The TilePPr is a modular ATCA system consisting of a custom ATCA Carrier board and several mezzanine cards. The IFIC-TileCal group is responsible for the hardware and firmware designs, production, installation, and maintenance of the PPr modules.

The presentation will give a comprehensive overview of the current and future systems for the HL-LHC, including a description of the hardware and firmware developments underway within the IFIC-TileCal group.

Which session do you think it fits best?

DAQ & Infrastructure for Phase-2 systems

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