

# Testbeam performance of ALTIROC3 hybrid assemblies with LGAD sensors for the ATLAS HGTD Upgrade

*Friday, 19 July 2024 20:45 (15 minutes)*

Timing measurements are critical for the detectors at the future HL-LHC. The ATLAS Collaboration builds a new High Granularity Timing detector (HGTD) for the forward region. A customized ASIC - ALTIROC - has been developed, to read out fast signals from low gain avalanche detectors (LGAD), which has  $\leq 50$  ps time resolution for signals from minimum ionising particles. A custom-designed pre-amplifier, discriminator, and TDC circuits with minimal jitter have been implemented in a series of prototype ASICs. The latest version, ALTIROC3, is designed to contain full functionality. Hybrid assemblies with ALTIROC3 ASICs and LGAD sensors have been characterized with charged-particle beams at DESY and CERN-SPS and with laser-light injection. The time-jitter contributions of the sensor, pre-amplifier, discriminator, TDC and digital readout are evaluated. The poster will introduce the HGTD project and present preliminary results from laboratory and test-beam measurements.

## Alternate track

### I read the instructions above

Yes

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