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Type: Talk

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

*Tuesday 27 August 2024 12:40 (20 minutes)*

Timing measurements are critical for the detectors at the future HL-LHC, to resolve reconstruction ambiguity when the number of simultaneous interactions reaches up to 200 per bunch crossing. The ATLAS collaboration therefore 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 50 ps time resolution for signals from minimum ionising particles. To meet these requirements, 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.

### Internet talk

No

### Is this an abstract from experimental collaboration?

Yes

### Name of experiment and experimental site

ATLAS

### Is the speaker for that presentation defined?

Yes

### Details

Salah El Dine Hammoud - IJCLab Saclay - France

**Authors:** VIVARELLI, Iacopo (Universita e INFN, Bologna (IT)); HAMMOUD, Salah El Dine (Université Paris-Saclay (FR))

**Presenter:** HAMMOUD, Salah El Dine (Université Paris-Saclay (FR))

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