

# A High-Granularity Timing Detector for the Phase-II upgrade of ATLAS: detector concept, description and R&D and beam test results

*Tuesday, May 25, 2021 8:06 AM (18 minutes)*

The increase of the particle flux (pile-up) at the HL-LHC with luminosities of  $L \approx 7.5 \times 10^{34} \text{ cm}^{-2}\text{s}^{-1}$  will have a severe impact on the ATLAS detector reconstruction and trigger performance. The end-cap and forward region where the liquid Argon calorimeter has coarser granularity and the inner tracker has poorer momentum resolution will be particularly affected. A High Granularity Timing Detector (HGTD) is proposed in front of the LAr endcap calorimeters for pile-up mitigation and for luminosity measurement. It will cover the pseudo-rapidity range from 2.4 to 4. Two Silicon sensors double sided layers will provide precision timing information for MIPs with a resolution better than 30ps per track in order to assign each particle to the correct vertex. Readout cells have a size of 1.3mm×1.3mm, leading to a highly granular detector with 3 M of channels. Low Gain Avalanche Detectors (LGAD) technology has been chosen as it provides enough gain to reach the large signal over noise ratio needed.

## TIPP2020 abstract resubmission?

## Funding information

**Primary authors:** STENZEL, Hasko (Justus-Liebig-Universitaet Giessen (DE)); TNOURJI, Abdellah (Université Clermont Auvergne (FR))

**Presenter:** TNOURJI, Abdellah (Université Clermont Auvergne (FR))

**Session Classification:** Experiments: High energy physics

**Track Classification:** Experiments: Experiments: High energy physics