Contribution ID: **58** Type: **Parallel session talk**

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

Monday, 25 May 2020 14:00 (18 minutes)

The increase of the particle flux at the HL-LHC with luminosities of L ⊠ 7.5 × 10^{34} $cm^{-2}s^{-1}$ 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 end-cap calorimeters. Covering a pseudo-rapidity range from 2.4 to 4.0 two double sided silicon sensor layers will provide timing information a resolution better than 30 ps per track for vertex identification. Readout cells have a size of 1.3 mm × 1.3 mm, leading to a highly granular detector with 3 millions 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.The requirements, overall specifications and test beam results of the HGTD will be presented.

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