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The High-Granularity Timing Detector for ATLAS at HL-LHC

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The increased particle flux expected at the HL-LHC poses a serious challenge for the ATLAS detector performance, especially in the forward region which has reduced detector granularities. The High-Granularity Timing Detector (HGTD), featuring novel Low-Gain Avalanche Detector silicon technology, will provide pile-up mitigation and luminosity measurement capabilities, and augment the new all-silicon Inner Tracker in the pseudo-rapidity range from 2.4 to 4.0. Two double-sided layers will provide a timing resolution better than 50 ps/track for MIPs throughout the HL-LHC running period, and provide a new timing-based handle to assign particles to the correct vertex. The LGAD technology provides suitable gain to reach the required signal-to-noise ratio, and a granularity of $1.3 \times 1.3 \text{ mm}^2$ (3.7M channels in total). Requirements, specifications, technical designs, recent updates, and the project status will be presented, including the on-going R&D efforts on sensors, the readout ASIC, etc.

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