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The ATLAS High Granularity Timing Detector at the High-Luminosity LHC

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The upcoming High-Luminosity phase of the Large Hadron Collider (HL-LHC) will deliver unprecedented luminosities, posing significant challenges for particle reconstruction and pile-up mitigation. To preserve excellent tracking and vertexing performance under these conditions, the ATLAS experiment is developing the High Granularity Timing Detector (HGTD), a precision timing layer capable of measuring particle arrival times with ~ 50 picoseconds resolution.

In this talk, I will introduce you to the HL-LHC motivations and the role of HGTD within ATLAS. I will discuss the detector design and its readout architecture. Finally, I will highlight the contributions of the Laboratoire de Physique de Clermont Auvergne (LPCA) and my own involvement in the project, focusing on the development and validation of the data acquisition chain and system testing.

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