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HGTD testbeam at the SLAC beamline

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The ATLAS detector at CERN will undergo several updates for the High Luminosity phase of LHC in 2023. A completely new silicon tracker (ITk) will be installed, furthermore a new timing detector called High Granularity Timing Detector (HGTD) composed of 2 layers of high timing precision silicon detectors (LGADs) will be placed in the end-cap region of the detector.

The SLAC beamline in the end station A facility (ESTB) is equipped with a telescope of the EUDET type (codename: Caladium) that was produced by DESY for the RD50 collaboration. The setup in End Station A was used to produce results for the HGTD LGAD sensors.

LGADs (Low Gain Avalanche Detectors) are a relatively new technology that allows timing measurements with a precision of 20-50 ps of timing resolution. Bare single pad sensors and arrays on analog amplifier boards were tested to probe the efficiency, cross talk and time resolution as a function of position of the hit on the sensor. Since a critical parameter of the LGADs is the resistance to radiation damage the sensor were tested both before and after irradiation at different fluences.

In the presentation the setup for the experiment will be presented as well as the beam parameters and operating conditions at SLAC. Some test beam results will also be shown.

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