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Characterization of FBK low-gain avalanche detectors for the CMS MTD upgrade

The CMS MIP Timing Detector (MTD) will bring precision timing information as part of the Phase II upgrade program to prepare CMS for the HL-LHC. The MTD will provide hermetic timing coverage up to a pseudorapidity of $|\eta| = 3$, with time resolution better than 40 ps. In the high-radiation forward region from $|\eta|=1.6$ and 3.0, this is achieved with the Endcap Timing Layer (ETL) that is based on silicon low gain avalanche detectors (LGADs). An extensive LGAD R&D program is ongoing to characterize sensor performance to develop LGADs suitable for ETL. We discuss the details of the automated test beam DAQ environment developed for efficient characterization of prototype LGAD sensors at the Fermilab Test Beam Facility (FTBF), and the latest results for sensors produced by Fondazione Bruno Kessler (FBK) with a focus on characterization of radiation hardness and uniformity.

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