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## Radiation tolerance study of LGADs for the CMS Encap Timing Layer detector

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The Compact Muon Solenoid (CMS) detector at the CERN Large Hadron Collider (LHC) is undergoing an extensive Phase 2 upgrade program to prepare for the challenging conditions of the High-Luminosity LHC (HL-LHC). The addition of the MIP timing detector (MTD) to CMS will be critical to mitigate the impact of high pileup collisions anticipated during the HL-LHC. The MTD will provide timing information at an unprecedented precision level. The endcap part of MTD, Endcap Timing Layer (ETL), will depend on a new Silicon based technology, Low Gain Avalanche Diodes (LGADs), as well as a specially design ASIC to readout and digitize the LGAD signal. As part of the LGAD sensor market survey for the CMS ETL detector, a radiation tolerance study of LGADs irradiated with neutrons manufactured by FBK and IMB-CNM up to a fluence of  $1.5 \times 10^{15} \text{ n}_{\text{eq}}/\text{cm}^2$  is performed. The dependence of the collected charge, jitter and timing resolution on fluence is determined using a radioactive source and a TCT setup. The dependence of the capacitive cross-talk with the fluence at electrodes adjacent to the collector electrode is also shown.

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