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Measurement of silicon-sensor prototypes for the CMS High-Granularity Calorimeter Upgrade for HL-LHC

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Properties of 8" silicon-sensor prototypes for the CMS High Granularity Calorimeter (HGCAL) have been studied by measuring the leakage current and depletion voltage, before and after irradiation, at CERN. A semi-automated measurement setup, called PM8, and a fully-automated setup, called ALPS (Automatic Low-temperature Probe Station) have been developed at CERN for this purpose. Similar measurements have also been made at Florida State University (USA). Sensors with different properties (thickness, oxide quality, pstop...), supplied by Hamamatsu, have been characterized. Some well-behaved sensors were irradiated up to the fluence expected in CMS at the end of HL-LHC, at the Rhode Island Nuclear Science Center (RINSC), and, in addition to the IV/CV behaviours, the annealing behaviour was also studied. The results of this measurement campaign have contributed to the choice of the properties for the ongoing sensor pre-series, which will undergo large-scale testing before launching the full production of nearly 30000 sensors.

In-person participation

Yes

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