

# Long-term HV stability of the collected charge in charge multiplication sensors

*Thursday 20 November 2014 14:30 (20 minutes)*

Charge multiplications (CM) detectors have been proposed as candidates for radiation tolerant detectors for the High-Luminosity upgrades of the ATLAS and CMS experiments. An open question in the implementation of such sensors has been how the signal in the CM mode evolves over long-time periods under high-voltage conditions and voltage cycling, as would be relevant in applications at the LHC.

We present measurements of the collected charge on CM detectors over large time scales (days to weeks) under high voltage biasing conditions. Several irradiated detectors show a significant decrease in the collected charge after a few days while being held at a high bias voltage. Partial recover of the signal is possible after turning of the high voltage for a short time, although the maximum signal is never recovered. The measurements call into question the viability of CM sensors options for radiation-hard sensors for the HL-LHC.

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**Session Classification:** LGAD