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Long term performance of silicon strip detectors under high bias voltage: charge collection and laser measurements

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Recently it has been shown that silicon strip detectors, especially irradiated and showing charge multiplication, have decreasing performance when tested for several days under high voltage conditions.
This behaviour has been in some cases explained in some cases by a surface effect[1], coming from the dose released in the silicon oxide by the source used for the measurements. Other studies[2] showed that the phenomenon didn't come from the source but from the high voltage stress.
In this work we present new performance results by means of charge collection and laser measurements on ATLAS detectors irradiated up to 2e15n_eq/cmˆ2.
They proof that the high voltage (higher than 1kV) is definitely a stressing factor and that part of the initial performance can be recovered by a resting time without bias or by thermal treatments.

[1] Klanner, TIPP, talk, 06.2014.
[2] Mori et al., NIM A proceeding, 03.2015.

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