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Ageing Phenomena in the LHCb Outer Tracker

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The LHCb experiment is a single arm spectrometer, designed to study CP violation in B-decays at the Large Hadron Collider (LHC). It is crucial to accurately and efficiently detect the charged decay particles, in the high-density particle environment of the LHC. For this, the Outer Tracker (OT) is being constructed, consisting of ~55,000 straw tubes, covering in total an area of 360 m 2 of double layers. The detector is foreseen to operate under large particle rates, up to 100 kHz/cm per straw in the region closest to the beam. Despite extensive ageing tests conducted earlier on with the aid of test-modules, a degradation of the gas gain has been found in the mass-production modules under a rather modest level of radiation. This paper presents the observed phenomenon, together with ongoing investigations to both prevent the effect, as well as to repair the gain loss.

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