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Analysis of machine induced background to ALICE in the 2023 LHC ion run

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During the 2023 ion run at the LHC, where crystal collimation was regularly adopted for the first time, strong background levels were observed at the Inner Tracking System (ITS) of the ALICE detector. Some of the read-out chips became saturated, causing losses of angular acceptance. This background was mitigated with using a dispersion knob in the beam optics, letting some residual background remain. Considering that the next upgrade of ALICE ITS foresees a reduction of the interaction chamber aperture, understanding the mechanisms leading to this background appears critical to envision appropriated mitigation solutions. Preliminary studies showed that this background was related to losses at the upstream tertiary collimator (TCT), impacted by 207Pb ions issued from beam interaction with the crystals of the primary collimation stage. Based on FLUKA simulations, this paper investigates the propagation of the tertiary collimation showers towards the ALICE cavern.

Footnotes

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