

Radiation field characterization and particle tracking with Timepix3 in ATLAS and MoEDAL

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Timepix3 detectors are hybrid pixel detectors (256 x 256 pixels, pixel-pitch: 55 μm) providing simultaneous ToT and ToA measurement in each pixel with negligible dead time (~ 475 ns). Ionizing particle interactions in the sensor are seen as tracks with a rich set of features which can be exploited for particle identification and trajectory reconstruction (even with single layer setups). The presented contribution describes results achieved with Timepix3 installed in the ATLAS and MoEDAL experiments at CERN, where they perform real-time measurements of the radiation field composition, 3D particle trajectories and dE/dX spectroscopy. It is shown that, owing to the continuous operation and their large dynamic range of particle energies and count rate, Timepix3 detectors allow to study the induced radiation (radiation from radioisotope created during collision periods), changes in radiation levels during beam injection and particles emanating from the interaction points.

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