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Studies of the injector performance of the Silicon Drift Detector for ALICE experiment

The Inner Tracking System (ITS) of the ALICE experiment at LHC uses high precision Silicon Drift Detectors (SDD) in two of the six cylindrical layers. Detector drift speed is significantly influenced by variations in ambient temperature.

The drift velocity is determined by measuring the drift time of electrons injected at fixed known locations of the sensor volume by means of dedicated MOS devices (injectors).

For each SDD module, 99 injection points are implemented in each drift region, which are distributed along 3 lines located at different distances from the collection anodes, thus allowing measuring the drift speed in 33 positions along the anode axis.

Special calibration runs (injector run) are performed periodically (every 12 hours) during the physics data taking, in order to monitor the drift speed and store the resulting values in the database containing the detector calibration parameters that are used for the offline reconstruction.

We report the results of a study aimed at characterizing the time needed to stabilize the detector temperature and to have the injectors working with full efficiency. The study was carried out in 2010 and is based on the analyses of a series of dedicated data taking runs, which were taken every few minutes, while turning on and off the detector, for a period of two days.

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