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Simultaneous alignment and Lorentz angle calibration in the CMS silicon tracker using Millepede II

The CMS silicon tracker consists of 25 684 sensors that provide measurements of trajectories of charged particles that are used by almost any physics analysis at CMS. In order to achieve high measurement precision, the positions and orientations of all sensors have to be determined very accurately. This is achieved by track-based alignment using the global fit approach of the Millepede II program. This approach is capable of determining about 200 000 parameters simultaneously. The alignment precision reached such a high level that even small calibration inaccuracies are noticeable. Therefore the alignment framework has been extended to treat position sensitive calibration parameters. Of special interest is the Lorentz angle which affects the hit positions due to the drift of the signal electrons in the magnetic field. We present the results from measurements of the Lorentz angle and its time dependence during full 2012 data taking period as well as general description of the alignment and calibration procedure.

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