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CMS Tracker Alignment: Legacy results from LHC Run-II and Run-III prospects

The inner tracking system of the CMS experiment, which comprise of Silicon Pixel and Silicon Strip detectors, is designed to provide a precise measurement of the momentum of charged particles and to reconstruct the primary and secondary vertices. The movements of the different substructures of the tracker detectors driven by the operating conditions during data taking, require to regularly update the detector geometry in order to accurately describe position, orientation, and curvature of the tracker modules.

The procedure in which new parameters of the tracker geometry are determined is known as alignment of the tracker. The alignment procedure is performed several times during data taking using reconstructed tracks from collisions and cosmic rays data, and later on, further refined after the data taking period is finished. The tracker alignment performance corresponding to the ultimate accuracy of the alignment calibration for the legacy reprocessing of the CMS Run-II data will be presented. The data-driven methods used to derive the alignment parameters and the set of validations that monitor the performance of physics observables after the alignment will be reviewed. Finally, the prospects for the alignment calibration during the upcoming run of the LHC, where more challenging operation conditions are expected, will be addressed.

Significance

References

Speaker time zone

Compatible with Europe

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