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The alignment of the CMS Silicon Tracker

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The CMS all-silicon tracker consists of 16588 modules. In 2010 it has been successfully aligned using tracks from cosmic rays and pp-collisions, following the time dependent movements of its innermost pixel layers. Ultimate local precision is now achieved by the determination of sensor curvatures, challenging the algorithms to determine about 200000 parameters. Remaining alignment uncertainties are dominated by systematic effects that can bias track parameters by an amount relevant for physics analyses. These effects are controlled by adding further information, e.g. the mass of decaying resonances. The orientation of the TK respect to the magnetic field of CMS is determined with a stand-alone chiˆ2 minimization procedure. The geometries are finally validated with several tools, the monitored quantities include the basic track quantities (for both tracks from colliisons and cosmics) and physics resonances.

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