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Pixel detectors in LHC experiments

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During the past 20 years pixel detectors have advanced into precise tracking devices used in particle physics experiments.

Since 2008 they have been successfully used in three LHC experiments: Alice, Atlas and CMS.

What made these detectors difficult to build were the strict requirements for high readout speed, resistance to very high level of radiation and low mass.

All three LHC pixel detectors have shown very good performance and are contributing to the high quality of LHC data.

During this presentation the main design requirements and the architecture of the LHC pixel detectors will be presented.

We will compare the three detectors, highlighting the most relevant differences between them and the most relevant performance parameters.

Low noise, high efficiency and very good position resolution will be stressed, since these items can affect significantly the quality of the experimental data.

As an example, more details will be given concerning the operational experience of the CMS pixel detector.

Both, the Atlas and CMS collaborations have started an ambitious pixel development program for the upgraded SLHC detectors, which will have to operate in an even harsher radiation environment and at higher data rates. The upgrade path for both detectors will be briefly described.

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