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Tracker alignment of the CMS detector with Run 3 data

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The tracking system of the CMS experiment is the world's largest silicon tracker with its 1856 and 15148 silicon pixel and strip modules, respectively. To accurately reconstruct trajectories of charged particles the position, rotation and curvature of each module must be corrected such that the alignment resolution is smaller than, or comparable to, the hit resolution. This procedure is known as tracker alignment.

At the end of 2022 and 2023 the alignment was optimized with the aim to improve physics precision in the data reprocessing. A new inner layer of the barrel pixel was installed prior to Run 3 resulting in an increased need to mitigate irradiation of the pixel modules. In addition, the tracker alignment must account for other changes in track reconstruction caused by e.g. temperature variations and magnet cycles. The results of this effort are presented with a focus on physics performance, highlighting the strategies employed to tackle the challenges from Run 3 data-taking.

Alternate track

I read the instructions above

Yes

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