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Present and future of tracking and vertexing in CMS

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Accurate reconstruction of charged particle trajectories and measurement of their parameters (tracking) is one of the major challenges of the CMS experiment. A precise and efficient tracking is one of the critical components of the CMS physics program as it impacts the ability to reconstruct the physics objects needed to understand proton-proton collisions at the LHC. In this work, we describe the evolution of tracking and vertexing algorithms in CMS, both at the high-level trigger and for the offline reconstruction. Results will include how the adoption of heterogeneous architectures enables novel tracking approaches targeting both the LHC Run 3 and HL-LHC data-taking periods.

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