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Fast emulation of track reconstruction in CMS simulation

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Simulated samples of various physics processes are a key ingredient within analyses to unlock the physics behind LHC collision data. Samples with more and more statistics are required to keep up with the increasing amounts of recorded data. During sample generation, significant computing time is spent on the reconstruction of charged particle tracks from energy deposits which additionally scales with the pileup conditions. In CMS, the Fast Simulation package is developed providing a fast alternative to the standard simulation and reconstruction work flow. It employs various techniques to emulate track reconstruction effects in particle collision events amongst others. Several analysis groups in CMS are utilizing the package, in particular those requiring many samples to scan the parameter space of physics models (e.g. SUSY) or for the purpose of estimating systematic uncertainties. The strategies for and recent developments in this emulation are presented which features a novel, flexible implementation of tracking emulation while retaining a sufficient, tuneable accuracy.

Tertiary Keyword (Optional)

Secondary Keyword (Optional)

Reconstruction

Primary Keyword (Mandatory)

Simulation

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