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Automated Quality Monitoring and Validation of the CMS Reconstruction Software

A crucial component of the CMS Software is the reconstruction, which translates the signals coming from the detector's readout electronics into concrete physics objects such as leptons, photons and jets. Given its relevance for all physics analyses, the behaviour and quality of the reconstruction code must be carefully monitored. In particular, the compatibility of its outputs between subsequent releases and the impact of the usage of new algorithms must be carefully assessed. The automated procedure adopted by CMS to accomplish this ambitious task and the innovative tools developed for that purpose are presented. The whole chain of steps is illustrated, starting from the application testing over large ensembles of datasets emulating Tier-0, Tier-1 and Tier-2 environments, to the collection of the produced physical quantities in the form of several hundred thousand histograms, to the estimation of their compatibility between releases, to the final production and publication of reports characterised by an efficient representation of the information.

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