

Novel data analysis and detector monitoring tools for the CMS muon Drift Tubes

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With the LHC operating beyond its design parameters, CMS keeps pushing the limits of SM measures and BSM searches. In this context, the CMS Drift Tubes community is challenged to assess performance with increasing accuracy, while identifying issues as soon as possible. Novel strategies and tools were explored for these purposes. Dedicated analysis-oriented data formats were designed to retain maximal detector information while constraining size down to 10 KB/event, aiming for inclusion in central production. An advanced automation framework, developed within CMS, was used to deploy analysis pipelines that get triggered by filters based on external conditions or overall data quality. Finally, a quasi-interactive declarative analysis approach, relying on Dask for parallel processing, was explored to ensure prompt inspection of large data volumes. We summarise the achievements in all above fronts and report the experience collected over the 2024 LHC run, when tools were firstly deployed.

Alternate track

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