

FCCAnalyses: Python-Driven Analysis at Scale for the Future Circular Collider

Monday, 7 September 2026 11:00 (15 minutes)

FCCAnalyses is the common analysis framework for the Future Circular Collider (FCC) study, built on ROOT's RDataFrame and the EDM4hep event data model. Its performance-critical processing is written in C++, but the framework is designed and driven from Python end-to-end: users configure analyses, manage dataset metadata, and run their processing on anything from a laptop to a grid site through a single Python interface.

We present a set of recent additions that make this Python layer more capable and consistent. Analyses can now be submitted to grid resources via DIRAC, alongside the existing HTCondor support, through the same command. Reading and writing data now supports ROOT's new RNTuple format alongside the established TTree. Analyses using full fledged EDM4hep objects through PODIO DataSource can also access additional metadata stored in EDM4hep files, such as multiple event weights, directly from Python. Finally, a new fit subcommand lets users define statistical models natively in Python instead of separate configuration files, and generates the inputs needed for the CMS Combine tool automatically. We'll walk through these additions from a user's perspective and use the workshop's discussion sessions to compare notes with other framework developers on analysis tools, distributed computing, packaging, and where our tools overlap with the wider Python HEP ecosystem.

Primary authors: STAPF, Birgit Sylvia (CERN); SMIESKO, Juraj (CERN); KONTAXAKIS, Pantelis (Universite de Geneve (CH))

Presenters: STAPF, Birgit Sylvia (CERN); SMIESKO, Juraj (CERN); KONTAXAKIS, Pantelis (Universite de Geneve (CH))

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