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RooFit - a data modeling language for physics analysis

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RooFit is a library of C++ classes that facilitate data modeling in the ROOT environment. Mathematical concepts such as variables, (probability density) functions and integrals are represented as C++ objects. The package provides a flexible framework for building complex fit models through classes that mimic math operators. For all constructed models RooFit provides a concise yet powerful interface for fitting, plotting and toy Monte Carlo generation as well as sophisticated tools to manage large scale projects. RooFit has been used in countless published B-factory results and more recently also at the LHC. We will review recent developments such as the ability to persist models in ROOT files in container classes, which provides the basis for several new concepts and techniques. This enables the concept of digital publishing of analytical likelihood functions with an arbitrary number of parameters, which in turn is the basis of the RooStats statistical tools that combine Higgs analysis channels of ATLAS and CMS. Combined models can be technically trivially constructed exploiting the editing and introspection methods provided by RooFit modeling classes. Persistability also enable streaming of tasks to other computers which facilitates parallelized calculation of computing intensive problems.

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