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RooStats: A high-level statistical framework based on RooFit

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The LHC has enormous discovery potential and poses many new statistical challenges. We will review the requirements for statistical toolkit for the LHC experiments, including the ability to combine the results of multiple measurements, incorporate systematic uncertainty, and facilitate the technical aspects of sharing code. In recent years, several statistical methods have been proposed to incorporate systematic uncertainty ranging from Bayesian, to fully Frequentist, to hybrid techniques. It will be shown that these various methods can have quite different properties, which makes it imperative that the toolkit allows for one to simultaneously evaluate the same problem with multiple techniques. With these considerations in mind, we set out to develop a statistical toolkit for ROOT. The RooFit package has a large user community and an abstract PDF class that can support both Bayesian and Frequentist interpretations; thus, we decided to base the statistical toolkit on the existing RooFit components and call the package RooStats. Finally, we will give some examples and outline our plans for further development.

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