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Physics potential of precision measurements of the LHC luminosity

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The uncertainty in the determination of the LHC luminosity is rapidly becoming a limiting factor for the analysis and interpretation of many important LHC processes. In this talk first of all we discuss the theoretical accuracy of total cross sections and examine in which cases the luminosity error is or will be dominant. We then review the impact of LHC data in PDF determinations, with enphasis on the effects of the luminosity uncertainty. We explore the requirements for the accuracy of the 2011 luminosity determination from the point of view of standard candle cross section and other important processes. Finally we discuss what we can learn from the accurate measurement of cross section ratios at different center of mass energies for processes like W, ttbar and dijet production.

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