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$\Delta M_W < 10 \text{ MeV}/c^2$ at the LHC: a forlorn hope?

At the LHC, the measurement of the W mass with a precision of $O(10) \text{ MeV}/c^2$ is both mandatory and difficult. In the analysis strategies proposed so far, shortcuts have been made that are justified for proton-antiproton collisions at the Tevatron, but not for proton-proton collisions at the LHC. The root of the problem lies in the inadequate knowledge of parton density functions of the proton. It is argued that in order to reach a $10 \text{ MeV}/c^2$ precision for the W mass, more precise parton density functions of the proton are needed, and an LHC-specific analysis strategy ought to be pursued. Proposals are made on both issues.

Primary author: KRASNY, Mieczyslaw Witold (Universites de Paris VI et VII)

Presenter: SIODMOK, Andrzej Konrad (Karlsruhe Institute of Technology (KIT))

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