Avviso di seminario

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Measurement of the W boson mass with the CMS experiment

The W boson mass (m_W) is one of the fundamental parameters of the standard model (SM) of particle physics, and is closely related to other parameters of the theory. A global fit to SM parameters predicts m_W = 80353 ± 6 MeV, corresponding to a precision better than 10^{-4}. Achieving a similar precision in a direct measurement of m_W is crucial to test the internal consistency of the theory, because any observed deviation from the prediction would provide an indirect evidence of new physics beyond the SM. The current experimental average, which combines different measurements from multiple experiments at the LEP, Tevatron, and also LHC, gives m_W= 80369.2 ± 13.3 MeV, in agreement with the SM.
However, in recent years the CDF Collaboration has reported a new measurement with an uncertainty of 9.4 MeV, currently the most precise from a single experiment but also in strong tension with the SM prediction, hinting to possible effects from new physics.
New determinations of m_W targeting the same precision as the SM prediction are thus mandatory to solve this puzzle. This talk presents the first measurement of m_W carried out by the CMS Collaboration at the LHC, using data collected at 13 TeV. Innovative experimental techniques and a novel approach to deal with theoretical uncertainties have been adopted, resulting in the most precise determination of mW at the LHC, with a precision comparable to the one of the CDF result.

Svolgimento Seminario
il giorno **14/11/2024** dalle **14:00** alle **16:00**,
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