Contribution ID: **575** Type: **not specified**

Measurement of the W-boson mass at the LHC: Shortcuts revisited.

Friday 17 July 2009 09:35 (15 minutes)

The claim that the W mass will be measured at the LHC with a precision of O(10) MeV is critically reviewed. It is argued that such a precision cannot be achieved, unless a dedicated measurement programme, specific to the LHC collider is pursued. We propose such a programme. Its main target is to significantly improve the experimental control of the relative polarization of the W+, W- and Z bosons. We want to achieve this goal either in dedicated LHC collider runs with the isoscalar beams, or, by running, in parallel to the standard pp collision program, a dedicated muon scattering "LHC-support-experiment" at the CERN SPS. One of these auxiliary measurements is necessary for the "precision measurement programme" at the LHC, but not sufficient. It must be followed by dedicated measurement strategies which are robust with respect to both the systematic measurement uncertainties and to the perturbative and nonperturbative QCD effects. We propose such strategies and evaluate their precision.

At the LHC, contrary to the Tevatron case, both the masses of the W+ and of the W- bosons must be measured with high precision. We propose two contributions to this conference. The first one, by Florent Fayette, proposes and evaluates the LHC dedicated strategies to measure the difference of the masses of the W+ and W- bosons. The second one, by Andrzej Siodmok, proposes the strategy to measure the W boson mass under the assumption that both masses are equal. We shall show in these presentations how one can overcome (circumvent) the obstacles in measuring the masses of W+ and W- to a precision of 10 MeV. We shall present a detailed evaluation of the precision of the proposed methods based on the studies of a large, O(10ˆ11) sample of simulated W and Z production events.

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Session Classification: VII. Standard Model Electroweak Physics

Track Classification: Standard Model Electroweak Physics