



Contribution ID: 207

Type: **Parallel Session Talk**

Determination of the Luminosity by the LHC Experiments

Thursday, 22 July 2010 09:25 (15 minutes)

The high resolution of the LHCb vertex detector allows for precise measurements of vertex positions of beam-gas and beam-beam interactions. From these measurements beam parameters such as width and position can be inferred. A novel method will be presented for determining the absolute luminosity at the LHC using these directly measured beam parameters, in combination with beam intensity information provided by the accelerator. Results will be shown for both the 2009 and 2010 run, and prospects for the ultimate precision of this method will be discussed. A forward look will also be given to alternative methods of luminosity determination which with data samples of $\sim 1 \text{ fb}^{-1}$ will offer the possibility of $\sim 1\%$ level precision. These include measurements of the production rate of elastic two photon dimuon production, and studies based on W and Z production in the forward region.

In addition, luminosity measurements at ATLAS and CMS will also be discussed.

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Session Classification: 01 - Early Experience and Results from LHC

Track Classification: 01 - Early Experience and Results from LHC