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Luminosity determination in pp collisions with the ATLAS detector at LHC

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An accurate measurement of the delivered luminosity is a key component of the ATLAS physics program. For cross-section measurements of Standard Model processes, the uncertainty on the delivered luminosity is one of the relevant systematic uncertainties. Searches for new physics also rely on accurate information about the delivered luminosity to evaluate background levels and determine sensitivity to new physics signatures. The evaluation of the luminosity scale is performed using several luminosity-sensitive detectors (LUCID, BCM, TILECAL and FCAL) and different algorithms. The general method for calibrating the ATLAS luminosity scale is based on dedicated van der Meer scans (also called beam separation or luminosity scan). The results of 2011 van der Meer scans as well as the systematic uncertainties on the luminosity calibration are here presented. The impact of the luminosity determination on the measurement of the elastic and total cross section performed by the forward detector ALFA is also discussed.

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