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CMS luminosity measurement for the 2018 data-taking period at sqrt(s) =13 TeV

Maximally precise calibration of the CMS luminosity measurement is critical for many physics measurements. To guarantee high quality absolute calibration, a complete van der Meer scan program was carried out at the CMS experiment in 2018. The systematic uncertainty on the absolute calibration from the van der Meer scans is derived with a precision of 2.1%. The performance and stability of the CMS luminometers is also evaluated using emittance scans taken throughout the course of the year, which allows for independent nonlinearity measurements and correction for each luminometer. Cross-detector stability and linearity, together with the normalization uncertainty from the van der Meer scans, results in a total luminosity uncertainty of 2.5%. The dominant systematic uncertainty arises from the x-y correlations of the beam shape, with other major contributions from stability and nonlinearity effects.

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