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Measurement of the total cross section of pp collisions at $\sqrt{s}=7$ TeV from elastic scattering with the ATLAS detector

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The ATLAS measurement of the total p-p cross section at the LHC at $\sqrt{s}=7$ TeV is presented. In a special LHC run with high betastar beam optics corresponding to an integrated luminosity of 80 inverse microbarn the elastic scattering process is measured in the range of the momentum transverse t from $-t=0.0025$ GeV² to $-t=0.38$ GeV² with the ALFA detector of ATLAS. From the extrapolation of the differential elastic cross section to $t=0$ GeV² using the optical theorem the total cross section $\sigma(pp \rightarrow X)$ is extracted with the luminosity-dependent method. In addition the nuclear slope of the elastic t -spectrum, the total elastic and inelastic cross sections are determined.

Summary

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