

# Measurements of Proton-Proton Elastic Scattering and Total Cross-Section at the LHC by TOTEM

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## Summary

TOTEM has measured elastic pp scattering at  $\sqrt{s} = 7$  TeV to  $|t|$  as low as  $5 \times 10^{-3} \text{ GeV}^2$ . The data were taken in several runs with special beam optics ( $\beta^* = 90$  m) and Roman Pot detectors placed as close as 4.8 sigma from the outgoing beams. In addition, the inelastic rates were recorded with the telescopes T1 and T2 for  $5.3 < |\eta| < 6.4$ . Thus the total pp cross-section could be measured with 3 different techniques: (1) the luminosity-independent method via the optical theorem (OT); (2) also via the OT but using only  $d\sigma(\text{el}) / dt (t=0)$  with the lumi from CMS; (3) as direct sum of elastic and inelastic cross-sections with the lumi from CMS. All results agree within their errors.

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