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Recent cross section, diffractive and forward multiplicity measurements with TOTEM

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TOTEM is dedicated experiment at the LHC to the measurements of elastic, diffractive and other forward processes. Elastically and diffractively scattered protons are measured using silicon detectors in Roman Pots (RP) and charged particles by the T1 and T2 telescopes covering the pseudorapidity range 3.1 to 6.5.

TOTEM has measured the luminosity-independent total, elastic and inelastic proton-proton cross-sections at sqrt(s) = 7 TeV and 8 TeV using dedicated beta* = 90 m optics runs. At sqrt(s) = 7 TeV, the cross-sections were also determined using the CMS luminosity giving results that are in excellent agreement with the luminosity-independent measurements, despite having very different systematic dependencies.

TOTEM has also studied soft single- and double-diffractive processes at sqrt(s) = 7 TeV. Preliminary results for single diffraction with masses above 3.4 GeV with the proton measured in the RPs as well as for double diffraction with masses in the 3.4-8 GeV range will be shown. In addition, TOTEM has performed an inclusive forward charged particle pseudorapidity density measurement in the 5.3 to 6.4 range using T2.

Furthermore, TOTEM has repeated the charged particle density measurement at sqrt(s) = 8 TeV using a dedicated run taken with a common CMS/TOTEM trigger in three different event samples: an inclusive, a non-single diffractive enhanced with charged particles in both T2 arms and a single-diffractive enhanced with only charged particles in one T2 arm. Finally, TOTEM has together with CMS studied soft central diffraction (by measuring both protons) and hard single and central diffraction (by measuring one or two protons plus central jets) at sqrt(s) = 8 TeV. A summary of these measurements will be reported.

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