



Contribution ID: 405

Type: Poster

Elastic scattering, total cross-section and charged particle pseudorapidity density in 7 TeV pp reactions measured by the TOTEM Experiment at the LHC

Thursday, August 16, 2012 4:00 PM (2 hours)

The TOTEM experiment at LHC measured the differential cross-section of elastic p+p scattering at 7 TeV, with the help of Roman Pot detectors placed as close as seven times the transverse beam size from the outgoing beams [1]. Results indicate an initial exponential decrease of $d\sigma/dt$, followed by a significant diffractive minimum at $|t| = (0.53 \pm 0.01(\text{stat}) \pm 0.01(\text{syst})) \text{ GeV}^2$. For large $|t|$ values, the cross-section exhibits a power law behavior.

By extrapolation of measured elastic p+p cross sections to $|t| = 0$, TOTEM obtained a total elastic scattering cross-section of $24.8 \pm 0.2(\text{stat}) \pm 1.2(\text{syst}) \text{ mb}$ [2]. Applying the optical theorem and using the luminosity measurement from CMS, a total proton-proton cross-section of $(98.3 \pm 0.2(\text{stat}) \pm 2.8(\text{syst})) \text{ mb}$ was deduced. TOTEM also measured the charged particle pseudorapidity density $dN/d\eta$ in p+p collisions at 7 TeV, in the pseudorapidity range $5.3 < |\eta| < 6.4$ [3]. This measurement extends the analogous measurements performed by the other LHC experiments to the so far unexplored forward η range.

References:

- [1] "Proton-proton elastic scattering at the LHC energy of $\sqrt{s}=7\text{TeV}$ "
The TOTEM Collaboration (G. Antchev et al.), Europhys. Lett., 95 (2011) 41001
- [2] "First measurement of the total proton-proton cross-section at the LHC energy of $\sqrt{s} = 7 \text{ TeV}$ "
The TOTEM Collaboration (G. Antchev et al.), Europhys. Lett., 96 (2011) 21002
- [3] "Measurement of the forward charged particle pseudorapidity density in pp collisions at $\sqrt{s} = 7 \text{ TeV}$ with the TOTEM experiment"
The TOTEM Collaboration (G. Antchev et al.), CERN-PH-EP-2012-106

Primary author: CSANAD, Mate (for the TOTEM Collaboration)

Presenter: CSANAD, Mate (for the TOTEM Collaboration)

Session Classification: Poster Session Reception

Track Classification: Exploring the QCD phase diagram