



Contribution ID: 39

Type: not specified

The CMS-TOTEM Precision Proton Spectrometer and first physics results

Wednesday 18 April 2018 16:54 (24 minutes)

The CT-PPS (CMS-TOTEM Precision Proton Spectrometer) detector system consists of silicon tracking stations as well as timing detectors to measure both the position and direction of protons and their time-of-flight with high precision. They are located at around 200 m from the interaction point in the very forward region on both sides of the CMS experiment. CT-PPS is built to study Central Exclusive Production (CEP) in proton-proton collisions at LHC, including photon-photon production of W and Z boson pairs, high-mass diphoton and dilepton production, high-pT jet production, as well as searches for anomalous couplings and new resonances.

The CT-PPS detector has taken data at high luminosity while fully integrated to the CMS data acquisition system. The total data collected correspond to around 55 fb^{-1} . In this presentation the CT-PPS operation, commissioning and performance are discussed.

The measurements of dilepton and diphoton production in photon-photon fusion with CT-PPS are presented. For the first time, exclusive dilepton production at high masses have been observed in the CMS detector while one or two outgoing protons are measured in CT-PPS using around 10 fb^{-1} of data accumulated in 2016 during high-luminosity LHC operation. These first results show a good understanding, calibration and alignment of the new CT-PPS detectors. Preliminary results concerning the search for high-mass exclusive diphoton production are presented.

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Session Classification: WG2: Small-x and Diffraction

Track Classification: WG2: Small-x and Diffraction