Results from the combined CMS and TOTEM data taking and high-mass dilepton and diphoton production with the CMS-TOTEM Precision Proton Spectrometer

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The measurements of diffractive and exclusive processes in proton-proton collisions at 8 and 13 TeV are presented, covering results of hard single-diffractive and low-mass central diffractive processes. Events are selected by requiring the presence of scattered protons reconstructed in the Roman Pot detectors of the TOTEM experiment. Results from special data taking periods at 8 and 13 TeV with a high-$\beta^*$ LHC optics configuration and small average number of pile-up events are shown. The data amount to roughly 50-\(\text{nb}^{-1}\) at 8 TeV and 400-\(\text{nb}^{-1}\) at 13 TeV.

Additionally, the measurements of dilepton and diphoton production in photon-photon fusion with the CMS-TOTEM Precision Proton Spectrometer (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-\(\text{fb}^{-1}\) 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 installed in 2016. Preliminary results and expectations concerning the search for high-mass exclusive diphoton production are discussed.

Primary author: LLORET IGLESIAS, Lara (LIP Laboratorio de Instrumentacao e Fisica Experimental de Part)

Presenter: LLORET IGLESIAS, Lara (LIP Laboratorio de Instrumentacao e Fisica Experimental de Part)

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