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Hard diffraction, photon-photon fusion and searches for new physics with proton tagging at CMS

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This talk will review the measurements of hard-diffractive dijet production and hard color-singlet exchange in dijet events from special data taken with a high- β^* LHC optics configuration and low instantaneous luminosity.

Additionally, the measurements of central exclusive production (CEP) with the CMS Precision Proton Spectrometer (PPS) will be presented: high-mass dilepton production and the first searches for two-photon, W and Z boson pairs, and top quark pairs with tagged protons, using over 100 fb^{-1} of data collected during the LHC Run 2.

Finally, a generic search using the missing mass technique will be discussed, in events with an associated Z boson or photon, and tagged protons.

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