



Contribution ID: 27

Type: **not specified**

Performance of proton reconstruction with the CMS Precision Proton Spectrometer

Wednesday 27 April 2022 15:40 (20 minutes)

The CMS group at UERJ has been an integral part of the Precision Proton Spectrometer (PPS) subsystem project of the collaboration.

The PPS detector system has been installed and integrated into the CMS experiment since 2016 and has collected over 110 fb^{-1} of data during the LHC Run 2.

It is a joint project of the CMS and TOTEM collaborations with the capability of measuring protons scattered at very small angles, operating at high instantaneous luminosity.

The physics motivation of the PPS project is the study of central exclusive production (CEP), i.e. the process $pp \rightarrow p^{(*)} + X + p^{(*)}$, mediated by colour-singlet gluon exchange, photons or Z bosons, by detecting at least one of the outgoing protons.

CEP provides unique sensitivity to SM processes and BSM physics, e.g. searches for anomalous gauge couplings, axion-like particles, inclusive dark matter (DM) and DM mediator searches, and new resonances.

This talk will review the PPS detector system, and the recent proton reconstruction performance results using Run 2 data. The improvements for Run 3 and the design and expected performance at the HL-LHC will also be discussed.

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Session Classification: Sessão 3

Track Classification: Sessão 3