

Diffraction Higgs Production: Experiment

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TOTEM forward measurements: exclusive central diffraction

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Abstract

In this contribution, we present a first systematic study of the precision of the momentum measurement of protons produced in the central exclusive diffractive processes, $pp \rightarrow p + X + p$, as well as the accuracy of the reconstructed mass for particle state X based on these proton measurements. The scattered protons are traced along the LHC beam line using the nominal LHC optics, accounting for uncertainties related to beam transport and proton detection.

To search for and precisely measure new particle states X with masses below 200 GeV, additional leading proton detectors are required at about 420 m from the interaction point in addition to the already approved detectors. Using these additional detectors, a mass resolution of the order of 1 GeV can be achieved for masses beyond ~ 120 GeV.

TOTEM forward measurements: leading proton acceptance

V. Avati and K. Osterberg

Abstract

We report about the acceptance of forward leading protons in Roman Pot stations placed along the LHC beam line. The TOTEM stations plus additional detectors at 420 m from the interaction point have been considered using the low- β^* optics V6.5 for LHC physics runs.

Diffraction Higgs: CMS/TOTEM Level-1 Trigger Studies

M. Arneodo, V. Avati, R. Croft, F. Ferro, M. Grothe, C. Hogg, F. Oljemark, K. Osterberg and M. Ruspa

Abstract

Retaining events containing a Higgs Boson with mass around 120 GeV poses a special challenge to triggering at the LHC due to the relatively low transverse momenta of the decay products. We discuss the potential of including into the CMS trigger the TOTEM forward detectors and possible additional detectors at a distance of 420 m from the CMS interaction point. We find that the output rate of a 2-jet Level-1 trigger condition with thresholds sufficiently low for the decay products of a 120 GeV Higgs Boson can be limited to $\mathcal{O}(1)$ kHz for luminosities of up to $2 \times 10^{33} \text{cm}^{-2} \text{s}^{-1}$ by including the TOTEM forward detectors in the Level-1 trigger.

Proposal to upgrade the very forward region at CMS

V. Andreev, A. Bunyatyan, H. Jung, M. Kapishin and L. Lytkin

Abstract

The possibilities of extending the acceptance of LHC experiments beyond 7 units of pseudorapidity are investigated. With additional detectors it would be possible to measure the particles with energies above 2 TeV in the pseudorapidity range between 7 and 11.