



Contribution ID: 166

Type: Talk

Search for Dark Matter (DM) using monophoton final state in p-p collisions using the CMS detector at the LHC

Monday 12 December 2022 18:00 (15 minutes)

We report on the results of new physics searches in a final state containing a photon and missing transverse energy called “monophoton searches” in a p-p collision at $\sqrt{s}=13\text{TeV}$. The data correspond to an integrated luminosity of 138fb^{-1} . In the Standard Model, the only process that results in the genuine signature of a single photon and large MET is $Z + \gamma$ production, in which the Z boson decays into a neutrino (ν) and an antineutrino ($\bar{\nu}$). The rate of $Z + \gamma$ production can be precisely calculated in the SM, and therefore a deviation of the observation from the prediction in this signature is a robust indicator of the physics beyond the standard model. This process, in which the Z boson decays to 2 neutrinos, is the irreducible process, as the signal and background look exactly the same in the detector. In practice, multiple other collision and non-collision processes mimic the signature and thus constitute the additional background to this search. We aim to reduce the contributions from such non- $Z+\gamma$ backgrounds and other remaining backgrounds using the data-driven techniques and Monte Carlo (MC) simulations. Results are interpreted in the context of dark matter using simplified models and large extra dimensions using ADD model

Session

Beyond the Standard Model

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Session Classification: WG2-Beyond the Standard Model