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Probing Compressed Higgsino Models via Vector Boson Fusion Processes at the LHC

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The identity of Dark Matter (DM) is one of the most active topics in particle physics today. Supersymmetric models, theoretical extensions of the Standard Model (SM), provide possible explanations to the particle nature of DM. Considering R-parity conservation in supersymmetric models such as the Minimal Supersymmetric Standard Model (MSSM) provides a natural DM candidate: the lightest neutralino ($\tilde{\chi}_0^1$). Most of the theoretical models have considered $\tilde{\chi}_0^1$ as a Bino or Wino particle. However, the Higgsino-like $\tilde{\chi}_0^1$ is also an alternate candidate. In the Higgsino search proposed, the Vector Boson Fusion (VBF) topology is used to overcome the limited experimental sensitivity in compressed mass spectra regions. The presentation explores the use of VBF topology to target DM production of Higgsino-like scenarios in compressed mass spectra regions at the LHC.

Author: Ms CARDONA CAÑAVERAL, Nathalia (Universidad de los Andes)

Presenter: Ms CARDONA CAÑAVERAL, Nathalia (Universidad de los Andes)

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