Abstract Submitted
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**Search for Higgsino inside Large Hadron Collider via Vector Boson Fusion**[1] CHENG TAO, ALFREDO GURROLA, Vanderbilt University, ANDRES FLOREZ, NATHALIA CARDONA, Universidad de los Andes (Colombia), WILL JOHNS, PAUL SHELDON, Vanderbilt University — Supersymmetry (SUSY) is a theoretical extension of the standard model (SM) of particle physics that could describe the particle nature of Dark Matter (DM). In SUSY models assuming R-parity conservation, the lightest neutralino is neutral, stable, and interacts with SM particles in the early universe to give the DM relic density observed today. A Higgs-like neutralino (Higgsino) is known to be a promising candidate for DM. Current search methods for Higgsinos at the LHC mainly rely on Drell-Yan production mechanisms, however, are experimentally difficult in cases where the mass of the DM candidate is only slightly less than the masses of other neutralinos, making these so-called compressed spectrum Higgsino scenarios important search targets using new techniques. The focus of this talk is on the development of a search methodology for Higgsino DM at LHC using Vector Boson Fusion (VBF) processes, which offers an alternative and complementary search strategy. We combine the VBF topology with a final state of one and two soft leptons and large missing momentum. The requirement of one or two soft leptons combined with jets of large dijet mass can significantly reduce SM backgrounds, resulting in enhanced Higgsino discovery potential at the LHC.

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