



Contribution ID: 1

Type: Talk

# Interplay of Inert Higgs Doublet and Vector Like lepton in the Context of Dark Matter and Collider Signature

*Tuesday 19 December 2023 15:45 (15 minutes)*

We discuss the interplay between the Inert Higgs Doublet (IDM) dark matter and a vector-like  $SU(2)_L$  triplet lepton (VLL), both of which are odd under  $Z_2$  symmetry. A compressed mass spectrum and a sufficiently small Yukawa coupling allows co-annihilation and late decay of the VLL into the IDM sector, which affects the relic density of the pseudoscalar dark matter. The same two factors enable displaced decay of the VLL states, providing novel signatures involving hadronically quiet displaced multi-lepton final states. Such signatures to probe the model are studied at the 14 and 27 TeV LHC, as well as the 100 TeV FCC-hh. The detection possibilities at the CMS, ATLAS and the proposed detector MATHUSLA are thoroughly explored.

## Designation

Student

## Reference publication/preprint

## Institution

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**Session Classification:** Parallel : Collider + BSM