



Contribution ID: 75

Type: Poster

Search for dark matter produced in association with a Higgs boson decaying to two taus and missing transverse momentum by using CMS data at $\sqrt{s} = 13$ TeV

Tuesday, December 12, 2023 12:15 PM (1 hour)

Abstract: The undetected dark matter search is performed in the final state of Higgs decaying to a pair of tau leptons with large missing transverse momentum (MET) by using the proton-proton collision data of CMS detector at CERN LHC, at the center of mass, $\sqrt{s}=13$ TeV. The benchmark models for this particular search are performed with two simplified models of DM + H productions. The first one is Z' -two-Higgs-Doublet(Z' -2HDM) model, where Z' will decay into a standard model like Higgs boson and an intermediate heavy pseudo-scalar particle (A), which further decays into a Dirac fermionic dark matter particle. In this model, the mass of pseudo-scalar, $A = 300$ GeV and DM mass = 100 GeV, the Z' masses from 550 GeV to 1265 GeV are excluded. The second model, is Z' baryonic model, where a new massive vector mediator Z' emits a Higgs boson, which further decays to a pair of Dirac fermionic DM particles. In this model, the dark matter mass up to 1 GeV and Z' masses up to 615 GeV are excluded.

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Session Classification: Poster Session 1