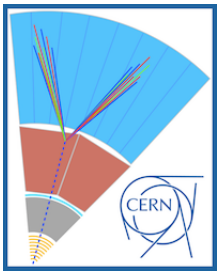

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CMS: Compressed electroweakinos in events with a low-momentum, displaced track

Thursday, 5 June 2025 10:30 (17 minutes)

Remote

A search is presented for higgsino dark matter (DM) in final states with a low momentum (soft), isolated track and large missing transverse momentum. In the minimal supersymmetric standard model (MSSM), charginos are most often produced in association with a nearly mass-degenerate neutralino or another chargino, and predominantly decay into the lightest neutralino (DM candidate) and a soft pion. For a mass difference $\Delta m^{\pm}$ less than 1 GeV, a discernible displacement of the pion's track with respect to the primary vertex can arise, reaching up to about 1 cm for the smallest allowed $\Delta m^{\pm}$. A parameterized multivariate classifier is employed to distinguish the signal track from background tracks, optimally targeting a range of Δm± by exploiting the track transverse momentum, impact parameter, and event topology to varying degrees depending on the assumed $\Delta m^{\pm}$. The analyzed data correspond to an integrated luminosity of 138 fb^{-1} collected by the CMS experiment in proton-proton collisions at $\sqrt{s} = 13$ TeV. No evidence of new physics is observed, and limits are set at the 95% confidence level in the mass plane of the model. Assuming MSSM cross sections, values of $\Delta m^{\pm}$ between 0.28 and 1.15 GeV are excluded for a 100 GeV mass chargino, and chargino masses up to 185 GeV are excluded for $\Delta m^{\pm}$ of 0.55 GeV.

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