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CMS: Search for long-lived particles using displaced vertices with low-momentum tracks and missing transverse momentum in proton-proton collisions at $\sqrt{s} = 13 \text{ TeV}$

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A search for long-lived particles using final states including a displaced vertex with low-momentum tracks, significant missing transverse momentum, and a jet from initial state radiation is presented. The search uses the proton-proton collision data at a center-of-mass energy of 13 TeV collected by the CMS experiment at the CERN LHC in 2017 and 2018 with a total integrated luminosity of 100 fb^{-1} . This search adopts specific supersymmetric (SUSY) coannihilation scenarios as benchmark signal models, characterized by a next-to-lightest SUSY particle (NLSP) with a mass difference of less than 25 GeV relative to the lightest SUSY particle (LSP). In the top squark coannihilation model, the NLSP is a long-lived top squark, while the LSP is a bino-like neutralino. In the bino-wino coannihilation model, the NLSPs are long-lived wino-like neutralino and prompt wino-like chargino, and the LSP remains a bino-like neutralino. The search excludes top squarks with masses less than 400-1100 GeV and wino-like neutralinos with masses less than 220-550 GeV, depending on the signal parameters. It sets the most stringent limits to date for the top squark coannihilation and bino-wino coannihilation models.

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