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Search for Supersymmetry With Razor Variables in Higgs to Diphoton Decays Produced in Association with Leptons and Jets in Proton-Proton Collisions at $\sqrt{s} = 13$ TeV¹ STEPHANIE KWAN², JIAJING MAO³, CRISTIAN PENA⁴, SI XIE⁵, MARIA SPIROPULU⁶, Caltech, CMS COLLABORATION — Supersymmetry (SUSY) is one of the most promising extensions of the standard model of particle physics. In SUSY models that conserve R-parity, the Lightest SUSY Particle (LSP) is stable and is a viable dark matter candidate. We present a search for SUSY with 13 TeV proton-proton collision data recorded in 2016 by the CMS experiment at the CERN LHC and corresponding to an integrated luminosity of 35.9 fb⁻¹. The final states under study include Higgs to diphoton decays produced in association with jets and leptons. SUSY scenarios are studied, in which the lightest neutralino has Higgsino-, bino-, or wino-like components, resulting in decays to photons and gravitinos, where the gravitinos escape undetected. We are currently pursuing a more inclusive approach by integrating the lepton categories into the existing search and thus increasing the sensitivity of CMS for electroweak SUSY production. Preliminary results show that the lepton search produces more stringent limits compared to the existing search.

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