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Dark matter in the light squark co-annihilation regime

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We study an MSSM scenario in which the only light sparticles are a bino-like dark matter candidate, and one or more light-flavored squarks. We find that this scenario has several interesting phenomenological features. In particular, LHC searches for the light squarks have reduced sensitivity, since the visible and invisible products tend to be softer. Moreover, bino-squark co-annihilation can allow even relatively heavy dark matter candidates to be consistent thermal relics. Finally, the dark matter nucleon scattering cross section is enhanced in the squeezed limit, allowing direct detection experiments to use both spin-independent and spin-dependent scattering to probe regions of parameter space beyond the those probed by the LHC. Although we have phrased this study in terms of the MSSM, the results generalize to models in which a gauge-singlet Majorana fermion dark matter candidate interacts with quarks via new charged scalars.

Summary

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