

Probing $U(1)$ extensions of the MSSM at the LHC Run I and in dark matter searches

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The $U(1)$ extended supersymmetric standard model (UMSSM) can accommodate a Higgs boson at 125 GeV without relying on large corrections from the top/stop sector. After imposing LHC results on the Higgs sector, on B-physics and on new particle searches as well as dark matter constraints, we show that this model offers two viable dark matter candidates, the right-handed (RH) sneutrino or the neutralino. Limits on supersymmetric partners from LHC simplified model searches are imposed using SModelS and allow for light squarks and gluinos. Moreover the upper limit on the relic abundance often favours scenarios with long-lived particles. Searches for a Z' at the LHC remain the most unambiguous probes of this model. Interestingly, the D-term contributions to the sfermion masses allow to explain the anomalous magnetic moment of the muon in specific corners of the parameter space with light smuons or left-handed (LH) sneutrinos. We finally emphasize the interplay between direct searches for dark matter and LHC simplified model searches. This talk is based on arXiv:1505.06243.

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