

SUSY explanation of the muon $g-2$ anomaly with and without stable neutralino

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Supersymmetry is an attractive new physics candidate that may explain the observed muon $g-2$ anomaly. MSSM can give large enough contribution to the muon $g-2$ only if there is (a) a large higgsino-gaugino mixing, or (b) a large L-R mixing in the Bino-like LSP scenario. Both cases are strongly constrained by the dark matter constraint. For example, the former case is severely constrained by the direct detection measurements, while the latter case suffers from overproduction of the Bino-like neutralino. We will first show how those constraints restrict the parameter space favoured by the muon $g-2$ assuming the neutralino is stable. In the second part of the talk, we study two scenarios where the neutralino is unstable and the dark matter constraints do not apply: (1) RPV and (2) GMSB with the gravitino LSP. We re-analyse the collider constraints on these scenarios and show how they open up (or close down) the muon $g-2$ parameter regions compared to the MSSM scenario with the stable neutralino. The talk is based on the recent paper 2202.12928.

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