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Muon $(g-2)_\mu$, Neutralino Dark Matter and the LHC

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We study the muon $(g-2)_\mu$ anomaly in light of neutralino dark matter and the LHC. We scan the MSSM parameters relevant to $(g-2)_\mu$ and focus on three different cases with different neutralino compositions. For $\tan\beta = 10$, we find that the 2σ range of $(g-2)_\mu$ requires the smuon ($\tilde{\mu}_1$) to be lighter than ~ 500 GeV. The neutralinos, $\tilde{\chi}_1^0, \tilde{\chi}_2^0$, have to be lighter than ~ 300 GeV and 900 GeV respectively. In contrast, for $\tan\beta = 50$, the corresponding upper limits are ~ 1 TeV for $\tilde{\mu}_1$ and ~ 650 GeV for $\tilde{\chi}_1^0$ and 1 TeV for $\tilde{\chi}_2^0$. We thereby study the prospects of searching these light smuons and neutralinos at the LHC, in conjunction with constraints coming from indirect detection experiments of dark matter.

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