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Gamma-ray signal from Dark Matter Annihilation mediated by mixing slepton

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In order to reconcile the tension between the collider SUSY particle search and the dark matter relic density constraint, we free ourselves from the simplest CMSSM model and find a large parameter space in which a sub-TeV bino dark matter may comply with all the current experimental constraints. In this so-called incredible bulk region, sleptons have a nonzero mixing angle while the dominant dark matter annihilation product is lepton-anti-lepton pair. We have explored this alternative and studied the resultant monochromatic gamma-ray signal produced by the $\gamma\gamma$ and γZ final state on top of the continuous internal bremsstrahlung signal. The spectrum will give some indications to the mixing angle and CP-violation phase of the slepton sector. Future ground-based and satellite-based experiments will reach the sensitivity of $10^{-29}\mathrm{cm}^3/\mathrm{s}$ for dark matter annihilation cross section and a 1% energy resolution at $\sim$ 100GeV will be able to detect our proposed signal through a cut-off analysis.

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