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Leptophobic Z' bosons in supersymmetry and where to find them

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The MSSM has undoubtedly been a successful framework in terms of suggesting solutions to the unresolved shortcomings of the Standard Model such as Dark Matter, the Gauge hierarchy problem etc. However, the lack of evidence for Supersymmetry at the LHC motivates us to investigate extensions of the MSSM basic gauge group structure, with the hope of finding answers to these questions. For this reason, we have studied a simple U(1)' extension of the MSSM group structure which can arise within the Grand Unified framework. Depending on particular gauge structure, such scenarios can lead a heavy Z' boson with various different features. The ATLAS and CMS collaborations have looked for such Z' bosons assuming that they can only decay into Standard Model channels, and have placed corresponding exclusion limits by considering dilepton, dijet and, to a smaller extent, top-antitop final states. We explore possible loopholes in these Z' searches by studying supersymmetric as well as leptophobic scenarios and we proposed a possible way to probe leptophobic Z' via supersymmetric final states.

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