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Exploring color-octet scalar parameter space in minimal R-symmetric models

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In this work we study the collider phenomenology of color-octet scalars (sgluons) in minimal supersymmetric models endowed with a global continuous R symmetry. We systematically catalog the significant decay channels of scalar and pseudoscalar sgluons and identify novel features that are natural in these models. These include decays in nonstandard diboson channels, such as to a gluon and a photon; three-body decays with considerable branching fractions; and long-lived particles with displaced vertex signatures. We also discuss the single and pair production of these particles and show that they can evade existing constraints from the Large Hadron Collider, to varying extents, in large regions of reasonable parameter space. We find, for instance, that a 725 GeV scalar and a 350 GeV or lighter pseudoscalar can still be accommodated in realistic scenarios.

Summary

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