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# Complex Singlet Benchmarks

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Introducing simplified models with new particles/symmetries is one of the simplest solutions to the questions unanswered by the Standard Model of particles physics. We explore the phenomenology of adding a complex scalar singlet to the Standard Model without imposing any additional symmetries. This extension is particularly interesting since the model has three scalar mass eigenstates. This allows the production of discalor resonances between two different mass states. Additionally, the model can produce decay chains with several scalar resonances and other unique collider signatures. We study several benchmark scenarios that highlight the importance of various thresholds and display the rich phenomenology of the complex singlet model. We consider constraints such as narrow width, boundedness, perturbative unitarity, Higgs fits, and direct searches. We also compare the projected constraints for future colliders experiments such as the High Luminosity Large Hadron Collider, the International Linear Collider, and the Future Circular Colliders.

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