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Multimessenger probes of a complex singlet extension of the Standard Model

We study multimessenger probes of a complex singlet extension of the Standard Model through a strongly first-order electroweak phase transition. The same phase transition can induce primordial black hole formation, generate stochastic gravitational waves, and modify the Higgs triple coupling.

We explore how these observables are correlated and show that they provide complementary ways to test the model at gravitational wave detectors, microlensing surveys, and future lepton colliders. In addition, the model contains a viable dark matter candidate, allowing for further constraints on the parameter space from current dark matter experiments.

This demonstrates the potential of a multimessenger strategy to probe new physics at the electroweak scale.

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