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Phenomenological constraints on a model with a Higgs-like dilaton and singlet scalar dark matter

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We consider a variant of the Standard Model with a Higgs-like dilaton, extended to include a singlet scalar dark matter candidate. In this model, the properties of the dilaton are constrained by the observed Higgs properties, dark matter relic abundance, and dark matter direct detection limits, as well as the latest collider limits. We place constraints on the free parameters of the model: the scale of conformal symmetry breaking f, the mass of the dark matter, and the ultraviolet contribution to the running of the dilaton-photon and dilaton-gluon couplings at a scale above conformal symmetry breaking, b_{UV}. The latter we treat as a free parameter to reflect our ignorance of the high-energy behavior of the underlying conformally invariant theory. We explore how the model can be further probed by future measurements.

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