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Vacuum stability of an extended standard model with U(1) symmetry

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In this work, we study the vacuum structure of an extended standard model with $\backslash U(1)\_D\$symmetry. The potential of the proposed mo$ scalar doublets and two scalar singlets. We theoretically analyze constraints, such as bounded-from-below, global minimum, and perturbativity up to the Planck scale. The experimental bounds from the Higgs invisible decay are also investigated.

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