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**Hierarchy problem in the Standard Model and extended Higgs potential with scale symmetry**

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### Abstract

In this research we introduce a model by adding two singlet scalars to the Higgs potential of the Standard Model and imposing scale symmetry to address the hierarchy problem. The scale symmetry plays a crucial role here. In the classical limit, all the scalars are massless. Only one of the singlet scalars and the Higgs doublet acquire non-zero expectation value. After diagonalization of the mass matrix, we have a massless singlet scalar, the so-called scalon, and two massive scalars. From quantum corrections, the scalon gets mass. Besides theoretical constraints on the parameters of the model, we impose bounds on the triple Higgs interactions provided by ATLAS and CMS detectors at the LHC.

**Keywords:** scale symmetry, the triple Higgs interaction, Standard Model

For full article, refer to the Persian section