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Confront a dilaton model with the LHC measurements

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The origin of the Higgs boson (H_{125}), discovered in 2012, remains a mystery. In the metric affine theory (MAT) framework, we study the scalar potential and investigate a couple of scenarios for the symmetry breaking mechanisms with a dilaton model which is derived from the geometry. The LHC constraints for the couplings of Yukawa couplings, Higgs-weak vector bosons and Higgs self-couplings, in this model are examined, which identify the parameter space where the discovered Higgs boson $m_h = 125$ GeV can be dilaton-dominant and the features of Higgs self-couplings are explored. It is found that via the measurements of Higgs pair production, the High Luminosity LHC (HL-LHC) running can either confirm or rule out the dilaton dominance.

Primary author: 静儿, 吴 (中国科学院大学物理科学学院)

Presenter: 静儿, 吴 (中国科学院大学物理科学学院)

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