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Vacuum stability and scalar masses in the superweak extension of the standard model

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We study the allowed parameter space of the scalar sector in the superweak extension of the standard model (SWSM). The allowed region is defined by the conditions of (i) stability of the vacuum and (ii) perturbativity up to the Planck scale, (iii) the pole mass of the Higgs boson falls into its experimentally measured range. The analysis uses two-loop renormalization group equations and quantum corrections to the parameters at two-loop accuracy. A well-defined region is found either if the mass of the new scalar M_s is larger or smaller than the Higgs boson mass. We study the dependence the allowed parameter space on the size of the sterile neutrino Yukawa coupling y_x . Finally, we discuss the SWSM quantum corrections to the W boson mass and check its effect on constraining the parameter space. The talk is based on the work <https://arxiv.org/abs/2204.07100>

In-person participation

Yes

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