

Black-holes-hedgehogs in the false vacuum and a new physics beyond the Standard Model

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In the present talk, we consider the existence of the two degenerate universal vacua: a) the first Electroweak vacuum at $v = 246$ GeV - “true vacuum”, and b) the second Planck scale “false vacuum” at $v_2 \sim 10^{18}$ GeV. In these vacua, we investigated the different topological defects. The main aim of this paper is an investigation of the hedgehog’s configurations as defects of the false vacuum. In the framework of the $f(R)$ gravity, suggested by authors in their Gravi-Weak Unification model, we obtained a black hole solution, which corresponds to a “hedgehog” - global monopole, “swallowed” by a black-hole with mass $\sim 10^{19}$ GeV. These black-holes form a lattice-like structure of the vacuum at the Planck scale. Considering the results of the hedgehog lattice theory in the framework of the SU(2) Yang-Mills gauge-invariant theory with hedgehogs in the Wilson loops, we have used the critical value of temperature for the hedgehog’s confinement phase. This result gave us the possibility to conclude that there exist triplet Higgs fields which can contribute to the SM at the energy scale $\simeq 10^4 \sim 10^5$ GeV. Showing a new physics at the scale $10 \sim 100$ TeV, these triplet Higgs particles can provide the stability of the EW-vacuum of the SM.

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