

# Standard(-like) Model from an SO(12) Grand Unified Theory in six-dimensions with S(2) extra-space

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We analyze a gauge-Higgs unification model which is based on a gauge theory defined on a six-dimensional spacetime with an  $S^2$  extra-space. We impose a symmetry condition for a gauge field and non-trivial boundary conditions of the  $S^2$ . We provide the scheme for constructing a four-dimensional theory from the six-dimensional gauge theory under these conditions. We then construct a concrete model based on an SO(12) gauge theory with fermions which lie in a 32 representation of SO(12), under the scheme. This model leads to a Standard-Model(-like) gauge theory which has gauge symmetry  $SU(3) \times SU(2)_L \times U(1)_Y (\times U(1)^2)$  and one generation of SM fermions, in four-dimensions. The Higgs sector of the model is also analyzed, and it is shown that the electroweak symmetry breaking and the prediction of W-boson and Higgs-boson masses are obtained.

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