

# Electroweak hierarchy from conformal and custodial symmetry

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I will introduce the idea of “Custodial Naturalness” to explain the origin of the electroweak hierarchy. Custodial Naturalness is based on classical scale invariance as well as an extension of the Standard Model (SM) scalar sector custodial symmetry to  $SO(6)$ . This requires a single new complex scalar field charged under a new  $U(1)$  gauge symmetry which partially overlaps with  $B-L$ . Classical scale invariance and the high-scale scalar sector custodial symmetry are radiatively broken by quantum effects that generate a new intermediate scale by dimensional transmutation. The little hierarchy problem is solved because the Higgs boson arises as pseudo-Nambu-Goldstone boson of the spontaneously broken  $SO(6)$  custodial symmetry. The minimal setting has the same number of parameters as the SM and predicts new physics in the form of a heavy  $Z'$  as well as a light but close-to invisible dilaton.

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