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New aspects of symmetry breaking in Grand Unified Theories

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Typically, only the minimal GUTs can be subject to a thorough scrutiny by complementary observables such as the proton lifetime, the absolute neutrino mass scale and the matching with the effective SM flavor structure. In this respect, the concept of minimality itself can be associated to the simplicity of the relevant Higgs sector. I will review some recent results on the Higgs sector of both ordinary and supersymmetric GUTs, focusing first on a class of minimal nonsupersymmetric SO(10) GUTs, fallen into disuse about 30 years ago and now revived by the quantum level analysis, and then on the investigation of the minimal SM-compatible flipped SO(10) and E(6) supersymmetric Higgs models.

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