

Light colored scalar as a messenger of up-, down-quark and charged lepton flavor dynamics in Grand Unified Theories

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The measured forward-backward asymmetry in the top pair production at Tevatron might be explained by exchange of an additional colored weak singlet. This state emerges naturally in a theoretically well-motivated class of grand unified models and it has some unique properties.

Namely, it interacts with the up-quarks only when they are from different generations. It is also a leptoquark as it couples to the down quarks and charged leptons. We systematically investigate a role of that state in the up-, down-quark and charged lepton physics. The constraints on the relevant Yukawa coupling constants come from the plethora of experimentally measured observables. We present implications of these bounds on the Yukawa couplings and associated predictions for the charged fermion sector.

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