



Contribution ID: 164

Type: Poster

Technicolor coupled models

Monday, 15 July 2019 18:30 (1h 30m)

When technicolor (TC), QCD, extended technicolor (ETC) and other interactions become coupled through their different Schwinger-Dyson equations, the solution of these equations are modified compared to those of the isolated equations. The change in the self-energies is similar to that obtained in the presence of four-fermion interactions, but without their ad hoc inclusion in the theory. In this case TC and QCD self-energies decrease logarithmically with the momenta, which allows us to build models where ETC boson masses can be pushed to very high energies, and their effects will barely appear at present energies. We develop the basic ideas of how viable TC models may be built along this line, where the different fermionic mass scales are dictated by the different strong interactions, and where ordinary lepton masses are naturally lighter than quark masses. One specific unified TC model associated with a necessary horizontal (or family) symmetry is described. The values of scalar and pseudo-Goldstone boson masses in this class of models are also discussed, as well as the consistency of the models with the experimental constraints.

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Session Classification: Wine & Cheese Poster Session

Track Classification: Searches for New Physics