

General Implications of the Froggatt-Nielsen Mechanism

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The fermion mass hierarchy of the Standard Model (SM) spans many orders of magnitude and begs for a further explanation. The Froggatt-Nielsen (FN) mechanism is a popular solution which introduces an additional $U(1)$ symmetry to the SM under which SM fermions are charged. We examine the phenomenological implications of the FN mechanism for the lepton sector in the most general way, by considering all possible charge assignments up to some maximum, assessing how naturally each charge assignment reproduces standard model masses and mixings. In this talk, we present results for the phenomenologically viable set of leptonic FN solutions. We calculate the magnitude of resulting flavor-changing observables and discuss the potential for distinguishing between different FN scenarios based on the patterns observed in flavor violation. We conclude with a discussion of the implications of this newfound understanding of the FN parameter space on mirror twin Higgs dark matter and the coincidence problem.

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