

Ratz & Trautner

Flavor symmetry and origin of CP Violation in Grand Unified Theories

The aim of this project is the investigation of the origin of CP violation (CPV) in Grand Unified Theories (GUTs). For this, possible flavor symmetries, which may be discrete or continuous, global or local, will be investigated with respect to their potential in constructing natural and predictive models to explain the presence and magnitude of CPV in flavor-changing, as well as the absence in flavor-conserving processes. This investigation will involve the development and usage of new mathematical tools, especially in the case of non-Abelian flavor symmetries. For supersymmetric (SUSY) theories, the idea of R symmetries as flavor symmetries will be investigated in light of the question why, in contrast to the SM sector, CPV is suppressed for the superpartners. An improved understanding of the origin of CPV may allow us to identify phenomenologically viable scenarios in which the origin of the flavor symmetry is well understood, what, in turn, would allow us to constrain the parameter space of so far undetermined quantities.