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Critical study of a Pati-Salam model.

One of the open questions in the Standard Model is what the origin for the mass hierarchy and mixing of fermions is. The question, the so called "flavor problem", arises because in the lagrangian of the Standard Model the masses and mixing angles are completely arbitrary, their values are explained by ad hoc Yukawa couplings to fit the experimental data without giving a theoretical motivation that make us able to understand such numbers.

A possible way to solve this problem is to use flavour symmetries and/or symmetries like GUT and/or of partial unification, in order to decrease the number of free parameters in the models.

I will focus on a model of partial unification, in particular a Pati-Salam model based on the gauge group $SU(4) \otimes SU(2)L \otimes SU(2)R$, developed by M. P. Worah in the 90's and maybe abandoned too early in favor of the more exotic SUSY theories. This model differs from others because of: fermions representations, the choice of the scalar multiplets, the use of singlet fermions and the fact that there are no mass couplings at renormalizable level, so that the distinction between the fermions masses comes from finite 1-loop contributions.

Experimental Collaboration

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