

XIX Meeting of Physics 2020



Contribution ID : 28

Type : **video conference**

charge quantization in exotic 331 models

Saturday, 26 September 2020 11:30 (30)

The extensions of the Standard Model based on the $SU(3)_C \otimes SU(3)_L \otimes U(1)_X$ gauge group are known as 331 models. Different properties such as the fermion assignment and the electric charges of the exotic spectrum, which define a particular 331 model, are fixed by a β parameter. In this work, we study the electric charge quantization in two versions of the 331 models, set by the conditions $\beta=1/(33-\sqrt{3})$ and $\beta=0$. In these frameworks, arise exotic particles, for instance, new leptons and gauge bosons with a fractional electric charge. Additionally, depending on the version, quarks with non-standard fractional electric charges or even neutral appear. Considering the definition of electric charge operator as a linear combination of the group generators that annihilates the vacuum, classical constraints from the invariance of the Lagrangian, and gauge and mixed gauge-gravitational anomalies cancellation, the quantization of the electric charge can be verified in both versions.

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Session Classification : Nuclear and Particles

Track Classification : Nuclear and Particles