Physicæ Proceedings

Seção
Abstracts

Neutrino mass from different SeeSaw mechanisms

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DOI: https://doi.org/10.5196/physicae.proceedings.XIYRM.44

Resumo

The flavor oscillation phenomenon detected in solar and atmospheric neutrinos proved that neutrinos have mass. However, the origin and the neutrino mass values are still unknown, since the oscillations parameters are only the difference of the squared mass and the mixing angle between the different eigenstates. From theoretical point of view the seesaw mechanism is the preferred model to explain neutrinos mass. In order to generate the left-handed neutrino mass, the type I seesaw mechanism extends the Standard Model content including right-handed neutrinos as SU (2) ⊗ U (1) singlet with Majorana mass term M. After the mass matrix diagonalization, the type I seesaw mechanism provides the following expression suppressed by the high-scale M in its denominator: mν ≈ v^2ew /M , where vew is a energy scale parameter at the electroweak range. Low energy phenomelogy requires vew ≈ 246GeV . Due to this fact, we see that neutrinos with mass at eV scale are obtained with M ∼ 10^15 GeV . This higher energy makes hopeless any kind of experimental test. With the purpose of realize the seesaw mechanism at TeV scale, we study the Triple Seesaw Mechanism, presenting, in this way, a mechanism with great potential of being probed at LHC. The minimum Higgs sector required by this mechanism is composed by the standard Higgs doublet plus another Higgs doublet and one Higgs singlet. Due to this extended Higgs sector, the expression for the neutrino masses in this mechanism get suppressed by the high-scale M^3 in its denominator. We are reviewing triple seesaw mechanism in a scenario where the heavy right-handed neutrinos mass is close to (1 − 10)T eV . Finally, we extend this work considering the mass term μ1 of the non standard Higgs of same magnitude of the high-scale M of the right-handed neutrinos, but the trilinear term in the potential is not restricted which gives us more liberty to arrange the neutrino mass. In conclusion, with this modification, we obtain an expression for mν which get suppressed by M^5.