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Anomaly-free abelian gauge symmetries with neutrino mass models

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In this work we show a study of the generation of neutrino masses is carried out from the Seesaw type II Mechanism for Dirac neutrinos. These mechanisms not only explain the mass of the neutrino but also its small value compared to charged quarks and leptons. Therefore, a model is proposed to obtain the small neutrino masses by extending the visible content of the Standard Model (SM) with a hidden sector composed of a scalar singlet S and two right-handed singlet neutrinos (ν_{R_1}, ν_{R_2}). These right-handed neutrinos are charged under a new symmetry $U(1)_X$. In addition, it is necessary to add a heavy scalar doublet to play the role of messenger between the visible sector (SM) and the hidden sector.
Extending the SM with a new abelian symmetry automatically violates the invariant of Lorentz, therefore the following conditions must
\begin{equation}
\sum_{\alpha=1}^{N'} n_{\alpha} + 3m =0 \„
\end{equation}

\begin{equation}
\sum_{\alpha=1}^{N'} n'^{3}_{\alpha} +3m^{3} = 0\„
\end{equation}

If the SM is extended with and additional dark $U(1)_D$ gauge symmetry (under which it is uncharged), and N right-handed chiral fields singlets under the SM group, the $U(1)_D$ is not anomalous if the Diophantine equations

\begin{align}
\sum_{\alpha=1}^{N} n_{\alpha} =&0\„ &
\sum_{\alpha=1}^{N} n'^{3}_{\alpha} =& 0\„
\end{align}

Therefore, we only have to worry about the solutions of the dark symmetry $U(1)_D$ since they contain the solutions of the active symmetries. To solve these equations, a computer program in Python is implemented that generates the possible charge values that the chiral fermions acquire.

Poster fallback option for rejected abstracts for parallel oral presentations

Author: JOHANA AGUDELO JARAMILLO, KIMY (Universidad de Antioquia)

Co-author: Prof. RESTREPO QUINTERO, DIEGO ALEJANDRO

Presenter: JOHANA AGUDELO JARAMILLO, KIMY (Universidad de Antioquia)

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