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A new neutrino mass sum rule from inverse seesaw

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Abstract content

The neutrino mixing mass matrix contains three mixing angles, one Dirac and two Majorana CP violating phases (in case to be Majorana particles) and can be parametrized in different equivalent ways. One particular ansatz is the Tribimaximal Mixing Matrix which despite the recent experimental confirmation of a non zero value for the θ_{13} mixing angle, can be used as a good first aproximation, taking into account that it can receive corrections from the charged lepton diagonalization and/or from renormalization terms, depending on its scale of validity. If neutrinoless double beta decay is observed, it would be the confirmation of the Majorana nature of neutrinos. The Majorana neutrinos are characterized by a symmetric mass matrix whose parameters are restricted by the experimental data, such as the mixing angles, squared mass differences and the limits on the neutrinoless double beta decay effective mass parameters. There are some flavor models based on non-abelian discrete symmetry groups, which predict a two-parameter neutrino mass matrix giving the particular TBM form. It has been shown in reference [arXiv:1111.5614] that only four mass relations (mass sum-rules) can be obtained in this kind of models, depending on two free parameters that characterizes each specific model. A classifications of the existing models predicting the TBM form and which generate three of the four mass relations is presented there. The last relation corresponds to a completely new case and here we propose a model based on the S_4 flavor symmetry that leads to the new neutrino mass sum-rule implementing the inverse seesaw mechanism, and discuss how to generate a non zero value for the angle θ_{13}.

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