

Axionic Dirac seesaw and electroweak vacuum stability

We explore the connection between tree-level Dirac neutrino masses and axion physics in a scenario where the PQ symmetry enforces lepton number conservation perturbatively. Requiring that the PQ scale f_a is the only heavy scale to play a role in neutrino mass generation, we are led to the construction of a KSVZ-type model where Dirac neutrino masses are inversely proportional to f_a , provided a real scalar triplet (zero hypercharge) is added to the SM scalar sector. We analyse this extended scalar sector, focusing on the stabilisation of the electroweak vacuum. The contribution of the triplet VEV to the W mass may also be responsible for the recent hint of beyond-the-SM physics by the CDF collaboration.

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