Title: Spontaneous leptonic CP violation and nonzero theta(13)

Author(s): Branco, G. C.[1,2]; **Gonzalez Felipe, R.**[1,2,3]; Joaquim, F. R.[1,2]; Serôdio, H.[1,2]

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Abstract: We consider a simple extension of the Standard Model by adding two Higgs triplets and a complex scalar singlet to its particle content. In this framework, the CP symmetry is spontaneously broken at high energies by the complex vacuum expectation value of the scalar singlet. Such a breaking leads to leptonic CP violation at low energies. The model also exhibits an A(4) X Z(4) flavor symmetry which, after being spontaneously broken at a high-energy scale, yields a tribimaximal pattern in the lepton sector. We consider small perturbations around the tribimaximal vacuum alignment condition in order to generate nonzero values of theta(13), as required by the latest neutrino oscillation data. It is shown that the value of theta(13) recently measured by the Daya Bay Reactor Neutrino Experiment can be accommodated in our framework together with large Dirac-type CP violation. We also address the viability of leptogenesis in our model through the out-of-equilibrium decays of the Higgs triplets. In particular, the CP asymmetries in the triplet decays into two leptons are computed and it is shown that the effective leptogenesis and low-energy CP-violating phases are directly linked.

KeyWords Plus: Double-Beta Decay; Discrete Flavor Symmetries; Neutrino Masses; Particle Physics; Triplet Seesaw; Leptogenesis; Models

Reprint Address: Branco, GC (reprint author), Univ Tecn Lisboa, Inst Super Tecn, Dept Fis, Av Rovisco Pais, P-1049001 Lisbon, Portugal.

Addresses:
1. Univ Tecn Lisboa, Inst Super Tecn, Dept Fis, P-1049001 Lisbon, Portugal
2. Univ Tecn Lisboa, Inst Super Tecn, Ctr Fis Teor Partículas, P-1049001 Lisbon, Portugal
3. Inst Super Engn Lisboa, P-1959007 Lisbon, Portugal

E-mail
Address: gbranco@ist.utl.pt; ricardo.felipe@ist.utl.pt; filipe.joaquim@ist.utl.pt; hserodio@cftp.ist.utl.pt

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