



## Poster session 3 – Wednesday 6 July

### P3.044 **Connecting $\theta_{13}$ , Dirac CP phase and Leptogenesis through spontaneous CP Violation**

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We have analyzed a general Type-II see saw mechanism to generate neutrino masses and mixing in a A4 based flavor symmetric framework. The Standard Model (SM) particle content is extended by three singlet right handed neutrinos, an additional higgs triplet along with few SM singlet flavon fields. The vacuum expectation values of these flavons generate the flavor structure of the neutrino mass matrix. In this set-up, the pure type-I contribution to the neutrino mass matrix exhibits a tri-bimaximal (TBM) pattern of lepton mixing where the triplet contribution is responsible for a deviation from it and hence a non-zero  $\theta_{13}$  consistent with recent experiments can be achieved. In doing so, a single flavon field (involved only in the triplet contribution) gets a complex vacuum expectation value (vev) while other flavons have real vevs and hence provides a unique source of spontaneous CP violation in the model. Adequate generation of lepton asymmetry is also exercised. Hence it turns out finally that the triplet contribution plays crucial role in providing a common source for non-zero  $\theta_{13}$ , Dirac CP phase and CP violation required for leptogenesis. We find that the recent hint for Dirac phase close to  $3\pi/2$  can be preferentially accommodated although it excludes the exact equality with  $3\pi/2$ . A prediction for the effective neutrino mass parameter associated with the neutrino-less double beta decay has been made.