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Octant Degeneracy, Quadrant of CPV phase at Long Baseline experiments and Baryogenesis

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In a recent work, we have studied, how CP violation discovery potential can be improved at long baseline neutrino experiments (LBNE/DUNE), by combining with its ND (near detector) and reactor experiments. In this work, we discuss how this study can be further analysed to resolve entanglement of the quadrant of CPV phase and Octant of atmospheric mixing angle θ23, at LBNEs. The study is done for both NH (Normal hierarchy) and IH (Inverted hierarchy). We further show how leptogenesis can enhance the effect of resolving this entanglement. A detailed analytic and numerical study of baryogenesis through leptogenesis is performed in this framework in a model independent way. We then compare our results of the baryon to photon ratio of the present day Universe with the current observational data of the baryon asymmetry, and elucidate how this can be used to pinpoint the Quadrant of leptonic CPV phase.

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