

$\theta_{PMNS_{13}} = \theta_C / \sqrt{2}$ from GUTs

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The recent observations of the leptonic mixing angle $\theta_{PMNS_{13}}$ are consistent with $\theta_{PMNS_{13}} = \theta_C / \sqrt{2}$ (with θ_C being the Cabibbo angle $\theta_{CKM_{12}}$). We discuss how this relation can emerge in Grand Unified Theories (GUTs) via charged lepton corrections. The key ingredient is that in GUTs the down-type quark Yukawa matrix and the charged lepton Yukawa matrix are generated from the same set of GUT operators, which implies that the resulting entries are linked and differ only by group theoretical Clebsch factors. This allows a link $\theta_{e_{12}} = \theta_C$ to be established, which can induce $\theta_{PMNS_{13}} = \theta_C / \sqrt{2}$ provided that the 1-3 mixing in the neutrino mass matrix is much smaller than θ_C . We find simple conditions under which $\theta_{PMNS_{13}} = \theta_C / \sqrt{2}$ can arise via this link in SU(5) GUTs and Pati-Salam models. We also discuss possible corrections to this relation. Using lepton mixing sum rules different neutrino mixing patterns can be distinguished by their predictions for the Dirac CP phase δ_{PMNS} .

Primary authors: Dr GROSS, Christian (Universität Basel); Mr SLUKA, Constantin (Universität Basel); Prof. ANTUSCH, Stefan (Universität Basel); Mr MAURER, Vinzenz (Universität Basel)

Presenter: Mr MAURER, Vinzenz (Universität Basel)

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