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P2.087 High scale mixing relations as a natural explanation for large neutrino mixing

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The origin of small mixing among the quarks and a large mixing among the neutrinos has been an open question in particle physics. In order to answer this question, we postulate general relations among the quarks and the leptonic mixing angles at a high scale, which could be the scale of Grand Unified Theories. The central idea of these relations is that the quark and the leptonic mixing angles can be unified at some high scale either due to some quark-lepton symmetry or some other underlying mechanism and as a consequence, the mixing angles of the leptonic sector are proportional to that of the quark sector. We investigate the phenomenology of the possible relations where the leptonic mixing angles are proportional to the quark mixing angles at the unification scale by taking into account the latest experimental constraints from the neutrino sector. These relations are able to explain the pattern of leptonic mixing at the low scale and thereby hint that these relations could be possible signatures of a quark-lepton symmetry or some other underlying quark-lepton mixing unification mechanism at some high scale linked to Grand Unified Theories.