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Embedding discrete symmetries: Large neutrino mixingin SO(10) GUT

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We present a common explanation of the fermion mass hierarchy and the large lepton mixing angles in the context of a grand unified flavor and gauge theory (GUTF). Our starting point is a SU(3)xU(1) flavor symmetry and a SO(10) GUT, a basic ingredient of our theory which plays a major role is that two different breaking pattern of the flavor symmetry are at work. On one side, the dynamical breaking of SU(3)xU(1) flavor symmetry into U(2)xZ_3 explains why one family is much heavier than the others. On the other side, an explicit symmetry breaking of SU(3) into a discrete flavor symmetry group is A4. Naturalness of the charged fermion mass hierarchy appears as a consequence of the continuous SU(3) flavor symmetry. Moreover, the same discrete A4-GUT invariant operators are the root of the large lepton mixing, small Cabibbo angle, and neutrino masses.

*based on work made in collaboration: F. Bazzocchi, S. Morisi, M. Picariello, E. Torrente-Lujan

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