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Weak Mixing Angle and Proton Stability in F-theory GUT

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It is pointed out that a class of flipped SU(5) models based on F-theory naturally explains the gauge coupling unification. It is because the group SU(5) x U(1)X is embedded in SO(10) and E_8. To prohibit the dimension 4 and 5 proton decay processes, the structure group should be SU(3) or smaller. Extra heavy vector-like pairs of {5{-2},5*_2} except only one pair of Higgs should be also disallowed, because they could induce the unwanted dimension 5 proton decays. We construct a simple global F-theory model considering these points. To maintain $\sin^2 \theta\_W^0 = 3/8$ at the GUT scale, the fluxes are turned-on only on the flavor branes.

Author: Prof. KYAE, Bumseok (Pusan National Univ.)

Presenter: Prof. KYAE, Bumseok (Pusan National Univ.)

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