

# Joint Theory Seminar

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**Title:** Can we have a low intermediate scale?

**Abstract:** A low intermediate scale within minimal supersymmetric SO(10) GUTs is a desirable feature to accommodate leptogenesis. We explore this possibility in models where the intermediate gauge symmetry breaks spontaneously by (a) doublet Higgs scalars and also (b) by triplets. In both scenarios gauge coupling unification requires the scale of left-right symmetry breaking ( $M_R$ ) to be close to the unification scale. This will entail unnaturally small neutrino Yukawa couplings to avoid the gravitino problem and allow successful leptogenesis. We point out that any one of three options threshold corrections due to the mass spectrum near the unification scale, gravity induced non-renormalizable operators near the Planck scale, or presence of additional light Higgs multiplets can permit unification along with much lower values of  $M_R$  as required for leptogenesis. In the triplet model, independent of these corrections, we find a lower bound on the intermediate scale,  $M_R > 10^9$  GeV, arising from the requirement that the theory must remain perturbative at least upto the GUT scale. We show that in the doublet model  $M_R$  can even be in the TeV region which, apart from permitting resonant leptogenesis, can be tested at LHC and ILC.

**Tuesday October 30, 4:10 - 6:00PM - Room 416 PHY/GEO**