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Minimal SU(5) theory on the edge: the importance of being effective

It is well known that the minimal renormalizable SU(5) grand unified theory is ruled out: it predicts same masses of down quarks and charged leptons, the gauge couplings do not unify and neutrinos are massless. We show here that all this can be cured simultaneously by the addition of higher-dimensional effective operators. However, the theory lives on the edge since the unification scale turns out as low as roughly 10^{14} GeV, threatening proton longevity. If the lower bound on the
proton lifetime was to be increased by an order of magnitude, the usual desert in energies between the weak and unification scales would be populated.

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