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Hidden fine tuning in the quark sector of little higgs models

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In little higgs models a collective symmetry prevents the higgs from acquiring a quadratically divergent mass at one loop. By considering first the littlest higgs model we show that this requires a fine tuning: the couplings in the model introduced to give the top quark a mass do not naturally respect the collective symmetry. We show the problem is generic: it arises from the fact that the would be collective symmetry of any one top quark mass term is broken by gauge interactions.

Author: Prof. GRINSTEIN, Benjamin (University of California San Diego and CERN)

Co-authors: Mr UTTAYARAT, Patipan (University of California San Diego); Dr KELLEY, Randall (Harvard Univesiry)

Presenter: Prof. GRINSTEIN, Benjamin (University of California San Diego and CERN)

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