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Technically Natural Higgs from Planck Scale

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The Standard Model (SM) fermion mass generation in the (Partially) Composite Higgs framework may suffer from problems due to, for example, reintroduction of new SM naturalness problems, generation of dangerous flavor changing neutral currents, instability of the Higgs vacuum, or challenging non-minimal model building. All these problems can be alleviated if these models have a large compositeness scale, but this requires an unnatural small vacuum misalignment. Therefore, I propose UV complete (Partially) Composite Higgs models with compositeness scale up to the Planck scale assisted by a novel mechanism. This mechanism is based on softly breaking a global Z_2 symmetry by technically natural small vacuum misalignment, dynamically triggering the electroweak symmetry breaking and SM fermion mass generation. I consider a concrete model example that fulfills this, where all the dimensionful fundamental parameters are approximately in the order of 10^{18} GeV. In addition, this concrete model example may also predict measurable gravitational waves, the neutrino masses, and the inflation.

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