

Rethinking Naturalness: The Interacting Ultraviolet Safe Behaviour of Non-Abelian Gauge-Yukawa Theories

Wednesday, March 25, 2015 9:50 AM (50 minutes)

I will critically introduce, classify and discuss the fundamental open issues related to either composite or elementary extensions of the standard model. As for the progress I will exhibit, among other things, the first proof of existence of nonsupersymmetric and non-asymptotically free 4D Gauge-Yukawa theories (structurally similar to the standard model) which are UV finite thanks to the existence of an exact interacting quantum UV fixed point in the gauge, Yukawa and scalar self-couplings. The quantum moduli space of the theory will also be precisely determined. Theories with this behaviour have been searched for on the lattice for the past several decades. Our results show the critical ingredients that are needed to construct these new classes of theories and offer a strategy for future lattice studies. I will then comment on the wide phenomenological impact of this discovery.

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