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Renormalization Group Fixed Point with a Fourth Generation[1]

P.Q. HUNG, CHI XIONG — In the Standard Model with four generations, at the two-loop level, we study the renormalization group equations for the Higgs quartic and Yukawa couplings and gauge couplings. The Yukawa sector is found to have a nontrivial fixed point structure. As the masses of the fourth family becomes sufficiently heavy, it will contain a natural scale Λ_{FP} in the range of a few TeV to the order of 10^3 TeV, above which the Higgs quartic and Yukawa couplings become practically constant. Around Λ_{FP} the Yukawa couplings are strong and make it possible for the fourth generation to form bound states, including composite extra Higgs doublets.

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