2001 Vol.35 No.2 pp.162-166 DOI:

Top Quark, Heavy Fermions and the Composite Higgs Boson

ZHANG Bin and ZHENG Han-Qing

Department of Physics, Peking University, Beijing 100871, China
(Received: 2000-3-24; Revised: 2000-6-1)

Abstract: We study the properties of heavy fermions in the vector-like representation of the electroweak gauge group $SU(2)_W \times U(1)_Y$ with Yukawa couplings to the standard model Higgs boson. Applying the renormalization group analysis, we discuss the effects of heavy fermions to the vacuum stability bound and the triviality bound on the mass of the Higgs boson. We also discuss the interesting possibility that the Higgs particle is composed of the top quark and heavy fermions. The bound on the composite Higgs mass is estimated using the method of Bardeen, Hill and Lindner (Phys. Rev. D 41 (1990) 1647), 150 GeV $\leqslant m_H \leqslant$ 450 GeV.

PACS: 12.60.-i, 12.60.Fr, 11.10.Hi

Key words: Higgs, compositeness, vector-like fermion