

Chromomagnetic and Chromoelectric Dipole Moments in the Fourth Generation Two-Higgs Doublet Model

Abstract

The CP violation is included in the SM by the complex phase of the CKM matrix but it is not enough to explain the baryon asymmetry, so it is important the study of new sources of CP violation beyond the SM. It is believed that the top quark play a special role due to its large mass and the study of its phenomenology might shed lights of new physics effects. At the CERN Large Hadron Collider (LHC) acts as a true top factory, producing hundreds of millions of top quarks every year. Therefore, the study of radiative corrections to the $t\bar{t}g$ vertex turns out very important. In this work we analyze the top quark chromomagnetic (CMDM) and chromoelectric dipole moments (CEDM) in the 4th generation two-Higgs doublet model (4G2HDM), where one of the Higgs doublets couples only to the fermions of the usual three generations, while the second doublet can be also coupled to 4th generation. The CEDM can only exist if CP is violated, so its detection would be a strong evidence of physics beyond the SM. The current bound on the mass of a 4th generation (M_4) quark is $400 \text{ GeV} < M_4 < 600 \text{ GeV}$. Since the CMDM and CEDM are generated by loops in which the 4th generation quarks runs into the loop, we expect enhanced contributions that could be tested at the LHC in the near future.

Primary author(s) : Mr. HERNÁNDEZ JUÁREZ, Alan Ignacio (BUAP)

Co-author(s) : Dr. MOYOTL-ACUAHUITL, Agustin (Cinvestav); Dr. TAVARES-VELASCO, Gilberto (Benemérita Universidad Autónoma de Puebla)

Presenter(s) : Mr. HERNÁNDEZ JUÁREZ, Alan Ignacio (BUAP)