Contribution ID: **20** Type: **not specified**

Charm Chromo-EDM as a Probe of Top-quark FCNC interactions

Tuesday, 13 May 2025 17:15 (20 minutes)

Electric dipole moments (EDMs) provide strong bounds on the CP structure of many New Physics (NP) scenarios. In this work, we study the charm Chromo-EDM (CEDM) within a new light scalar singlet with top-quark Flavour-Changing Neutral Current (FCNC) interactions. Such scalar singlet appears naturally in many well-motivated NP scenarios, such as the composite Higgs models. Unlike the Higgs boson in the Standard Model, it can induce large FCNCs in the top sector. Besides the CEDM, we also include the low-energy constraints from the $B_s \to \mu^+\mu^-$ decay and the muon anomalous magnetic moment $(g-2)_\mu$. We also perform a detailed Monte-Carlo simulation of the channel $pp \to tS + j$ with $S \to \mu^+\mu^-$ and $S \to b\bar{b}$, and investigate the LHC sensitivity to the tcS couplings. For the CP-violating tcS couplings $y^{ct}_{R,L} = |y^{ct}_{R,L}|e^{i\theta_{R,L}}$, it is found that the CEDM can provide bounds on the phase difference $\theta_L - \theta_R$, while the CP observables $\mathcal{A}^{\mu\mu}_{\Delta\Gamma_s}$ and $\mathcal{S}_{\mu\mu}$ of the $B_s \to \mu^+\mu^-$ decay are sensitive to the phase θ_R. Therefore, they are complementary to each other in probing the CP phases of the tcS couplings.

Primary author: Prof. YUAN, Xing-Bo (Central China Normal University)

Co-authors: HOU, Biao-Feng; LI, Xin-Qiang (Central China Normal Univerisy); YANG, Ya-Dong; ZHANG, Ming-Wang

Presenter: Prof. YUAN, Xing-Bo (Central China Normal University)

Session Classification: Parallel II: B