Non-decoupling Heavy Higgs Bosons as a Probe of Spontaneous CP-Violation

Friday 11 July 2025 10:30 (30 minutes)

CP-violation is essential for understanding the matter-antimatter asymmetry in the Universe and serves as a key component of physics beyond the Standard Model (SM). Extensions in the Higgs sector permit CP violations beyond the CKM phase. However, the origin of CP-violation remains unknown, as both spontaneous and explicit violations are feasible. In this talk, I present the phenomenological implications of Spontaneous CP-violation (SCPV) in the Two-Higgs Doublet Model (2HDM). There are two significant aspects in the SCPV 2HDM, i.e., non-decoupling nature of heavy Higgs bosons and flavor-violating structure of the additional Yukawa couplings. I will show that the non-decoupling nature leads to a considerable deviation and correlation in the self-coupling for the 125 GeV Higgs and its di-photon decay. I also discuss flavour-changing decays of the heavy Higgs bosons.

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