

Virtual TEP Seminar

UCLA

Tuesday, December 8th @ 4PM

Via Zoom

“Is SMEFT Enough?”

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Abstract: Treating the Standard Model as an Effective Field Theory (EFT) yields a general framework for exploring deviations in observables that probe the indirect effects of new particles. Two treatments are typically discussed --- Higgs EFT (HEFT) and Standard Model EFT (SMEFT) --- my goal in this talk is to compare and contrast them. The key difference between them is that HEFT is formulated assuming electroweak symmetry is broken such that the physical Higgs boson excitation and the Goldstone bosons are treated as independent objects. On the other hand, SMEFT is set in the electroweak symmetric background and utilizes the complete Higgs doublet as a building block. I will argue that in practice when one works with a finite number of EFT operators, HEFT has superior convergence properties for exploring the impact of new particles whose masses are near or below the weak scale. I will then turn to the question of when one is *required* to match onto HEFT, by exploring the singularity structure of the Higgs manifold. Many points will be clarified by relying on a variety of physical examples.