## Phenomenology 2022 Symposium: From Virtual to Real



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## Towards an All-Orders Flavor Formalism in the (geo)SM(EFT) and Beyond

Monday 9 May 2022 17:45 (15 minutes)

I will present novel model- and basis-independent formulae for calculating fermionic mass, mixing and CPviolation parameters given arbitrary 3x3 complex Yukawa couplings of the fundamental Lagrangian. The formalism is applicable to any construction whose Yukawas transform under certain global U(3) flavor symmetries, including the Standard Model (SM), numerous popular SM extensions and, as I will show, the geometric SM Effective Field Theory (geoSMEFT), which is a novel formulation of the SMEFT valid at all orders in the characteristic EFT expansion parameter v/Lambda. This merger of invariant theory and geoSMEFT technologies therefore allows for compact all-orders expressions for quark masses, CKM mixing angles and the Dirac phase. After showing off the applicability of the formulae, including the rapid derivation of renormalization group equations that are themselves valid at all orders in v/Lambda, I will discuss its future phenomenological and theoretical extensions, most notably in the neutrino flavor sector.

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