

Stückelberg Effective Field Theory

Tuesday, May 24, 2022 4:59 PM (23 minutes)

We explore the effective field theory of a vector field X_μ that has a Stückelberg mass. The absence of a gauge symmetry for X implies Lorentz-invariant operators are constructed directly from X_μ . Beyond the kinetic and mass terms, allowed interactions at the renormalizable level include X^4 , $H^2 X^2$ and $X^\mu j_\mu$, where j_μ is a global current of the SM or of a hidden sector. We show that all of these interactions lead to scattering amplitudes that grow with powers of the energy E , except for the case of X_μ coupling to an exactly conserved current. Our analysis suggests there is no free lunch by appealing to Stückelberg for the mass of a vector field: the price paid for avoiding a dark Higgs sector is replaced by the non-generic set of interactions that the Stückelberg vector field must have to avoid amplitudes that grow with energy.

Author: MARTIN, Adam Orion (University of Notre Dame (US))

Presenter: MARTIN, Adam Orion (University of Notre Dame (US))

Session Classification: Electroweak