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Consistent Searches for SMEFT Effects in Non-Resonant Dijet Events

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We investigate the bounds which can be placed on generic new-physics contributions to dijet production at the LHC using the framework of the Standard Model Effective Field Theory, deriving the first consistently-treated EFT bounds from non-resonant high-energy data. In order to reach consistent, model-independent EFT conclusions, it is necessary truncate the EFT effects consistently at the first non-trivial order in the expansion in inverse powers of the new-physics scale and to include the possibility of multiple operators simultaneously contributing to the observables, neither of which has been done in previous searches of this nature. Furthermore, it is important to give consistent error estimates for the theoretical predictions of the signal model, particularly in the region of phase space where the probed energy is approaching the cutoff scale of the EFT. There are two linear combinations of operators which contribute to dijet production in the SMEFT with distinct angular behavior; we identify those linear combinations and determine the ability of LHC searches to constrain them simultaneously.

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