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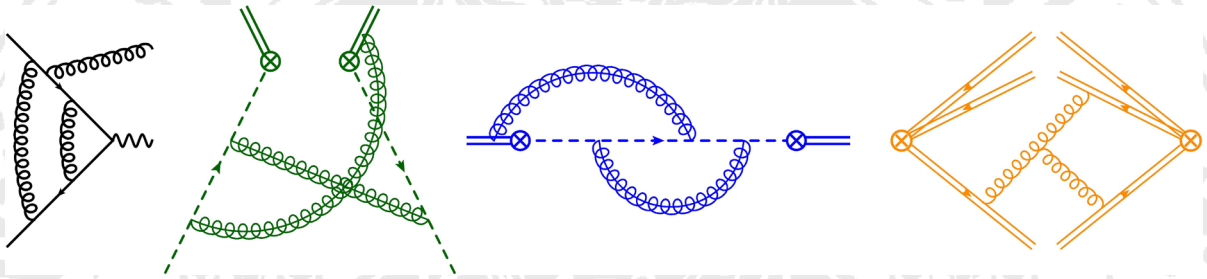

THE EFFECTIVE FIELD THEORY APPROACH TO COLLIDER PHYSICS

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So far no convincing evidence for new physics beyond the Standard Model (SM) has been found in collider experiments. This suggests that the yet-to-be-discovered new particles, whose existence is expected for plenty of theoretical reasons, either have too large masses to be directly produced or couple only very weakly to the known SM particles. In both cases their effect on collider observables is small and may only be detected in the comparison of very precise experimental data to similarly accurate theoretical SM predictions. On the theory side high precision typically requires calculations at high orders in perturbation theory, which are technically very challenging. Modern methods based on effective field theories (EFTs) play a crucial role in many of such calculations. High-energy scattering processes often involve several (energy) scales that largely differ in size. For instance the invariant mass of a produced particle jet is typically much smaller than its energy. EFTs exploit such large scale hierarchies to systematically organize the calculation of collider observables, e.g. jet cross sections, as an expansion in the small scale ratios. To reach the required precision often only the leading terms in this expansion need to be computed. This dramatically simplifies the calculation and sometimes only makes it feasible in the first place. I will explain the basic ideas behind the EFT approach to describe high-energy processes and highlight some of its major achievements.