Particle Theory Seminar

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"Tree-level event generation and the Sherpa Monte-Carlo"

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Abstract:

Monte Carlo event generators are an essential link between experimental and theoretical high-energy physics. Requirements for such programs have increased since their early days, not only in terms of modularity and flexibility. Also, rising precision needs with respect to QCD and QCD associated processes demand an improved simulation of the hard, perturbative part of the event. Many new tools have emerged, which aim at correct tree-level event generation at fixed and, in principle, arbitrary order, like MadGraph and ALPGEN. Fewer programs exist for parton shower simulation and even fewer codes attempt to consistently combine the two complementary approaches. Sherpa is one of the generators aiming at this task. We present the various techniques for tree- level event generation at the matrix element level within Sherpa. We briefly discuss a recently proposed shower algorithm and introduce a new merging method for fixed-order matrix elements and parton showers. We present applications to QCD jet production in e+e- collisions and Drell-Yan lepton pair production at the Tevatron.