

A novel algorithm for spin correlations in parton evolution

Tuesday 15 July 2025 16:30 (20 minutes)

Spin correlations between QCD emissions have so far been neglected in most of the parton shower algorithms commonly used for LHC predictions. However, their inclusion is crucial to achieve NLL accuracy or to include NLO contributions in these algorithms.

In this talk, we present a new algorithm for incorporating spin correlations into parton shower algorithms. Instead of using spin density matrices as in the Collins-Knowles algorithm, the common choice for this task, our algorithm relies on soft currents to exchange spin information between emissions. This has the advantage of reducing the number of amplitude evaluations and, thus, improving the performance compared to the standard algorithm. During the talk I will discuss the idea of the algorithm and the results of its first implementation for final-state particles. Once fully developed, it will be the basis for the inclusion of spin correlations in the parton shower code ALARIC.

Author: HOPPE, Diana Mareen (Technische Universitaet Dresden (DE))

Co-authors: REICHELT, Daniel; SIEGERT, Frank (Technische Universitaet Dresden (DE)); HOECHE, Stefan (Fermilab)

Presenter: HOPPE, Diana Mareen (Technische Universitaet Dresden (DE))

Session Classification: Recent developments in Monte Carlo generators