Sector showers with fixed-order corrections

Fixed-order corrections to parton showers often build upon the construction of "shower histories", accounting for all possible branching sequences to arrive at a given parton configuration. Constructing these histories at high particle multiplicities mandates fairly complex and resource-intensive algorithms.

In this talk, I will introduce the concept of so-called sector showers as implemented in the Vincia antenna shower. Sector showers divide the branching phase space into distinct "sectors", each of which only receives contributions from a single branching kernel. As a consequence, only a single branching history exists per colour-ordered state.

On the one hand, this allows to assign a unique scale to each parton configuration. On the other hand, it reduces the factorial scaling of the number of contributing histories to an effective linear scaling with the number of final-state particles.

I will discuss how these features can be utilised in efficient matching and merging techniques and present ongoing efforts to include higher-order corrections in Vincia.

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