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Simulating scattering amplitudes

The description of complex phenomena in large multiplicity final states of high energy collisions require a detailed understanding of scattering amplitudes with many external legs, and how such amplitudes are ultimately projected onto the asymptotic final states observed in experiments. I will introduce how we develop theoretical frameworks and simulation methods which go beyond the phenomenological reasoning and probabilistic algorithms underpinning the commonly used event generators, by introducing novel methods of simulating the evolution of density operators and scattering amplitudes for collider reactions and beyond.

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