



INVITATION

as part of the Particle Physics Seminar

to the talk by

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on

“QCD Scattering in the Regge Limit”

Abstract:

Fixed-order computations of QCD amplitudes in general kinematics are limited to either one, two or three loops, depending on the number of particles produced. This strongly motivates our theoretical research programme aimed at understanding the behaviour of quark and gluon scattering amplitudes in special kinematic limits, in which new factorization and exponentiation properties arise. A particularly interesting limit is the Regge limit, where major simplifications take place. A remarkable property of this limit is the exponentiation of energy logarithms, a phenomenon known as *gluon Reggeization*, leading to power-like dependence on the energy. This phenomenon can be investigated by establishing rapidity evolution equations. The dynamics is markedly more complex in full QCD, where colour off-diagonal evolution, generated by multi-Reggeon interactions, gives rise to Regge cuts, as compared to the planar limit, where this structure collapses onto a single Regge pole. Understanding this evolution facilitated in recent years the formulation of an effective two-dimensional theory of Reggeized gluons. Combining this with recent progress in $2 \rightarrow 2$ and $2 \rightarrow 3$ amplitude computations, we are now able to determine key ingredients beyond the next-to-leading tower of logarithms, such as the three-loop gluon Regge trajectory and the two-loop central-emission vertex. These, in turn, can be used to predict the structure of other multi-leg amplitudes and to determine the kernel of rapidity evolution to the next unknown order.

Time: Tuesday, 10 December 2024, 4:15 p.m.

Location: Erwin-Schrödinger Lecture Hall, 1090 Vienna, Boltzmannngasse 5, 5th floor

Join Zoom Meeting - Meeting ID: 933 4269 3866 Passcode: 185096

<https://univiennea.zoom.us/j/93342693866?pwd=aUpTR0VJNUhJY2Q0ajdaKzI1YWVhQ09>

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