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High energy scattering in QCD: from low to high Bjorken x

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We propose and develop a new formalism that generalizes the Color Glass Condensate approach to high energy scattering by including both small and large x gluons in the wave function of a target proton or nucleus. This allows one to treat particle production at both low and high transverse momenta on the same footing. We illustrate the formalism by calculating the differential cross section for scattering of a quark (or gluon) on a target proton or nucleus and show that inclusion of both small and large x gluon modes in the target allows one to investigate forward-backward (in rapidity) asymmetries in high energy collisions. It also leads to both even and odd anisotropic flow coefficients v_n in proton-proton and proton-nucleus collisions as well as double spin asymmetry A_{LL} in polarized proton-proton (light nucleus) scattering. We comment on how the formalism can be extended to study structure functions as well as di-jet production in DIS at both low and high x_B *Jorken*.

Author: JALILIAN-MARIAN, Jamal (Baruch College)

Presenter: JALILIAN-MARIAN, Jamal (Baruch College)

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