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High energy scattering in QCD at small Bjorken x: from ultra-high energy neutrinos and cosmic rays to high energy heavy ion collisions

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After a brief introduction to QCD at small x_{Bj} we show that the wave function of a hadron or nucleus at small x contain a large number of gluons. We argue that this kinematics dominates high energy scattering and that the hadron/nucleus can be describes as a strong classical color field from which a parton in the projectile scatters. We apply this formalism to particle production in Deep Inelastic Scattering off of protons and nuclei as well as to proton-nucleus collisions at RHIC and the LHC and elucidate the connections to scattering of cosmic rays.

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