

Probing Maximal Entanglement in Deep Inelastic Scattering

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It has been proposed that at small Bjorken x , or equivalently at high energy, hadrons represent maximally entangled states of quarks and gluons. Within this picture, entropy of final state hadrons measured in Deep Inelastic Scattering (DIS) can be interpreted as entanglement entropy which arises due to a partial observation of the proton in the DIS experiment. In this talk we present recent result on the description of hadronic entropy in the low x region, which suggest that the conjecture is in accord with experimental data from the electron-proton collider HERA. To probe the onset of maximal entanglement inside the proton, we further discuss diffractive reactions. It is shown that the data collected by the H1 Collaboration at HERA allows to probe the transition to the maximal entanglement regime. By relating the entanglement entropy to the entropy of final state hadrons, we find a good agreement with the H1 data using both the exact entropy formula as well as its asymptotic expansion which indicates the presence of a nearly maximally entangled state

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