

High-Energy Fixed-Angle Meson Scattering and Holographic QCD Strings

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We investigate the high-energy fixed-angle scattering of pions and rho mesons in a holographic QCD model, following the Polchinski–Strassler proposal. In agreement with earlier findings of Polchinski, Strassler and other authors, we observe partonic behaviour coming from string amplitudes in AdS spacetime. In our holographic approach, 2-to-n pion scattering amplitudes display agreement with known constituent counting rules found in QCD and other asymptotically free confining gauge theories. However, in naïve disagreement with these rules, we further report that 2-to-n scattering amplitudes that involve rho mesons, and where all the other scattered states can be pions, are suppressed in Mandelstam-s relative to the 2-to-n pion scattering amplitudes. Finally, several plots of differential cross-sections for 2-to-2 pion scattering as a function of s and the scattering angle are obtained at fixed values of s and separately at fixed scattering angles, some of the predictions are compared to experimental data and phenomenological aspects are discussed.

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