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Differential and total cross sections of high energy proton-proton scattering in holographic QCD

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We investigate the high energy proton-proton scattering in the framework of holographic QCD, which is an effective approach to QCD constructed based on the AdS/CFT correspondence. In our model setup, the involved nonperturbative partonic dynamics is described by the Pomeron exchange, which is realized applying the Reggeized spin 2 particle propagator together with the proton gravitational form factor obtained from the bottom-up AdS/QCD model. Our model includes only three adjustable parameters, and we determine them by fitting both the differential and total cross sections simultaneously to the experimental data, focusing on the Regge regime. The resulting differential and total cross sections are consistent with the data, including the ones recently measured at $\sqrt{s} = 13$ TeV by the TOTEM collaboration at the LHC. Our results imply that the present framework works well in the considered TeV scale, and further applications to other high energy scattering processes, in which the involved strong interaction can be approximated by the Pomeron exchange, are possible. This work will be presented as a paper soon.

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