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The dispersion relations and analysis of the new LHC data

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Analysis of the new experimental data obtained by the TOTEM and ATLAS Collaborations at LHC at $\sqrt{s} = 7$ and 8 TeV at small momentum transfer is presented. Some contradictions in the obtained sizes of the total cross sections are analyzed. The impact of the different assumptions on the extraction of the parameters of the elastic scattering amplitude, especially on the size of the total cross sections, is examined. The determination of the phase of the elastic scattering amplitude from the point of view of the Dispersion Relation is carried out. The origins of the dependence of the slopes of the different parts of the scattering amplitude over the momentum transfer are analyzed with taken into account the different models assumptions. Our new method of extracting the real part of the hadron scattering amplitude from experimental data is used to obtain the size of $\sigma_{\text{tot}}(s)$ and $\rho(s; t)$ and compare with the parameters of the hadron scattering amplitude obtained by the TOTEM and ATLAS Collaborations. The analysis of the data is compared with the similar analysis in the Regge approach for the hadron scattering amplitude.

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