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Diffractive phenomenology and Pomeron physics at the LHC era

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It is shown that "soft"proton-proton collisions at the LHC, from 2 TeV and beyond are dominated by Pomeron exchange. This is quantified e.g. by fitting the elastic scattering cross-section to the available (7 and 8 TeV) data, where the contribution from secondary Reggeons is shown to be smaller than the relevant experimental errors. A tiny Odderon contribution is also scrutinized and its parameters are defined. Due to Pomeron dominance, Regge factorization can be effectively used to relate e.g. double diffraction dissociation (DD) to single proton dissociation (SD) and elastic scattering. Predictions for SD and DD cross sections and their ratios for the RUN-2 LHC measurements are obtained. A dipole Pomeron model of diffractions dissociation compatible with unitarity is constructed and a dip in the t dependence of SD cross section around -1 GeV is predicted.

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