

ELASTIC AND INELASTIC DIFFRACTION AT THE LHC

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Diffraction phenomena at the LHC are being studied by several collaborations at CERN. In this paper we present our recent results on the deviation from the exponential behavior in elastic proton-proton scattering at low $|t|$ as well as central exclusive resonance production. Although the above phenomena occur in different kinematical regions, they are related e.g. by Regge-factorization.

Deviation from the exponential behavior of the diffraction cone observed near $t = -0.1 \text{ GeV}^2$ both at the ISR and the LHC (so-called break) follows from a two-pion loop in the t-channel imposed by unitarity. By using a simple Regge-pole model we extrapolate the "break" from the ISR energy region to that of the LHC. A model for Pomeron-Pomeron total cross section in the resonance region $M \leq 5 \text{ GeV}$ is also presented.

Central production is treated in a Regge pole including the Pomeron and two different f trajectories, as well as an isolated $f_0(500)$ resonance in the region $M \leq 1 \text{ GeV}$. A slowly varying background is included. The Pomeron-Pomeron cross section is not directly measurable, but is an essential ingredient for calculating exclusive resonance production at the LHC. The expected spectrum of produced glueballs is calculated.