

Production of light mesons in central diffractive pp collisions

Monday, 12 March 2018 11:30 (30 minutes)

We discuss central exclusive diffractive production of light mesons in the reactions $pp \rightarrow pp\pi^+\pi^-$ and $pp \rightarrow ppK^+K^-$ at high energies. The calculation is based on a tensor pomeron model [1] and the amplitudes for the processes are formulated in an effective field-theoretic approach. We include a purely diffractive dipion continuum, the scalar and tensor resonances decaying into the $\pi^+\pi^-$ pairs [2, 3] as well as the photoproduction contributions (ρ^0 , Drell-S\"oding) [4]. The theoretical results are compared with existing STAR, CDF, and CMS experimental data. Predictions for planned or being carried out experiments ALICE, ATLAS, LHCb are presented. We show the influence of the experimental cuts on the integrated cross section and on various differential distributions for outgoing particles. Distributions in rapidities and transverse momenta of outgoing protons and pions as well as correlations in azimuthal angle between them are presented. We discuss how two pomerons couple to tensor meson $f_2(1270)$ and the interference effects of resonance and dipion continuum. We discuss the $pp \rightarrow pp\pi^+\pi^-\pi^+\pi^-$ reaction via the intermediate $\sigma\sigma$ and $\rho\rho$ states [5]. The correct inclusion of the pomeron spin structure seems crucial for the considered sequential mechanisms in particular for the $\rho\rho$ contribution. We consider also the central exclusive production of the $p\bar{p}$ in the continuum and via resonances in proton-proton collisions [6]. We discuss the diffractive mechanism calculated within the tensor-pomeron approach including both pomeron and reggeon exchanges.

References:

1. C. Ewerz, M. Maniatis, O. Nachtmann, *Annals Phys.* 342 (2014) 31
2. P. Lebiedowicz, O. Nachtmann, A. Szczurek, *Annals Phys.* 344 (2014) 301
3. P. Lebiedowicz, O. Nachtmann, A. Szczurek, *Phys. Rev. D*93 (2016) 054015
4. P. Lebiedowicz, O. Nachtmann, A. Szczurek, *Phys. Rev. D*91 (2015) 074023
5. P. Lebiedowicz, O. Nachtmann, A. Szczurek, *Phys. Rev. D*94 (2016) 034017
6. P. Lebiedowicz, O. Nachtmann, A. Szczurek, arXiv:1801.03902

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Session Classification: QCD theory/phenomenology