

Central exclusive diffractive production of axial-vector f_1 mesons in proton-proton collisions

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We discuss the central exclusive production (CEP) of f_1 mesons in high-energy proton-proton collisions, where the diffractive pomeron-pomeron fusion process is expected to be dominant [1]. The theoretical results are calculated within the tensor-pomeron approach [2]. Two ways to construct the pomeron-pomeron- f_1 coupling are discussed. First we consider phenomenological approach. We adjust the parameters of model to the WA102 experimental data [3]. We compare these predictions with those of the Sakai-Sugimoto model [4], where the couplings are determined by the mixed axial-gravitational anomaly of QCD. The total cross section and several differential distributions are presented. Our results may be used to investigate the $pp \rightarrow pp\pi^+\pi^-\pi^+\pi^-$ reaction at LHC energies. Some effort to measure central exclusive four-pion production was initiated already by the ATLAS Collaboration [5]. Experimental studies of single meson CEP reactions by the LHC collaborations (ALICE, ATLAS, CMS, LHCb) will allow to extract many pomeron-pomeron-meson coupling parameters. Their theoretical calculation is a challenging problem of nonperturbative QCD.

References

- [1] P. Lebiedowicz, J. Leutgeb, O. Nachtmann, A. Rebhan, A. Szczurek, Phys. Rev. D102 (2020) 114003
- [2] C. Ewerz, M. Maniatis, O. Nachtmann, Annals Phys. 342 (2014) 31
- [3] D. Barberis et al. (WA102 Collaboration), Phys. Lett. B440 (1998) 225; A. Kirk, Phys. Lett. B489 (2000) 29
- [4] T. Sakai and S. Sugimoto, Prog. Theor. Phys. 113 (2005) 843; N. Anderson, S. K. Domokos, J. A. Harvey, N. Mann, Phys. Rev. D90 (2014) 086010
- [5] R. Sikora, CERN-THESIS-2020-235

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