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Odderon Searches and Hadronic Final States in Diffractive Scattering at HERA

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Abstract

Recent results on the hadronic final states in diffractive scattering at HERA are reported. An extensive search for the Odderon in exclusive meson final states has been carried out by the H1 Collaboration. The mesons π°, ω°, f_2, a_2 and b_1 have been searched for in their purely photonic decay modes. The pseudoscalars and tensors in this list can only be produced via odderon echange whereas the vectors and pseudovectors can originate from conventional pomeron exchange. The analysis has provided good agreement with Regge-based expectations for the pomeron channels and no signals in the odderon-mediated processes. The cross-section limits obtained exclude predictions for meson production via odderon exchange from the stochastic-vacuum-mdel (SVM).

The production of diffractive hadronic final states can in general be well described be a factorisation approach seperating a pomeron emission process from the proton, an internal partonic structure of the pomeron and finally a partonic sub-process calculable in QCD. Recent H1 results presented in the talk include a new next-leading-order fit of the diffractive structure function and the application of this fit in the framework of a full NLO calculation of 2-jet and open charm cross sections in DIS. A H1 study of 2-jet cross-sections in photoproduction demonstrates the feasibility of factorisation also in this regime and in particular for resolved photons over the full range of the momentum fraction x_γ. Finally an extensive study of open charm production in diffractive DIS has been carried ou by the ZEUS collaboration. In this analysis the total and differential cross-sections are determined, comparisons with NLO calculations are performed and the data are presented as a charm contribution to the diffractive structure function. A comparison with existing fits to diffractive structure functions demonstrates a strong sensitivity to gluon densitites in the pomeron.