

Report of supervisor

The dissertation of Radek Žlebčík „Diffractive Dijet Production with Leading Proton in ep Collisions at HERA“ is devoted to an analysis of diffractive interactions at H1 experiment at HERA. He studied dijet production in diffractive photoproduction as well as in deep inelastic scattering (DIS) events. The analysis led to the first publication in H1 experiment which uses the data where proton is detected in a Very Forward Proton Spectrometer placed 220 m from the central H1 detector. Such a analysis enables to exclude the proton dissociation which represents about 20 percent of events detected using alternative selection method - Large Rapidity Gap method of selection.

The dissertation consists of 8 chapters, the first and second chapters of the thesis present a general theoretical overview of the topic. The third chapter gives a short description of the H1 detector components used in this analysis. The next chapter presents an overview of previous diffractive measurements at HERA and Tevatron. In fifth chapter is described the method of data selection and reconstruction of two analyzed samples – DIS and photoproduction. To corrections for detection uncertainties – method of regularized unfolding, systematic uncertainties, hadronization corrections etc. – is devoted the next chapter. Results are summarized in seventh chapter, where are presented differential diffractive dijet cross sections in DIS and photoproduction and its comparison to NLO QCD calculations. The last chapter summarizes obtained results and brings the interpretation. The most striking result is that previously observed factorisation breaking for diffractive dijet photoproduction was confirmed by independent measurement using a different method of diffraction selection.

The amount of work covered by Radek during his PhD is enormous covering in principle two different analysis – dijets in photoproduction and dijets in DIS. This topic was performed completely by Radek and represents a new result of the H1 collaboration which was already published in JHEP journal in 2015. In addition, Radek, as the main author of this analysis, had a occasion to present these new results in various international conferences, such as DIS 2013 in Marseille, Hadron Structure in High Tatra 2013, DIS 2014 in Warsaw, Low x workshop in Kyoto in 2014. This shows undoubtedly the quality of Radek's work and the recognition of the H1 collaboration. Results he obtained are some of the most important results obtained in diffraction by the H1 collaboration in recent years. The reason is that this measurement confirms previous measurements of H1 in topic where results of two experiments H1 and ZEUS differ.

Radek's work is original and new, his contribution to the final results is overwhelming. He belonged to the best and most responsible students of H1 Collaboration. He became not only an expert in software but also an expert in theoretical interpretation of results, mainly in NLO QCD calculations. Due to this fact he was involved also to NLO calculations for the collider of the next generation, LHeC, where he is one of authors of the project. This shows the clear ability of Radek to deal with different topics in completely different areas of particle physics and to take some initiatives in the different domains. Last not least Radek has also very good anticipation for the work in large experimental groups – he was always able to help and advice to others.

I strongly recommend to award to Radek Žlebčík PhD degree.

