

Referee report for the habilitation thesis of **Dr. Jesús Guillermo Contreras Nuño**

**„The structure of hadrons at high energy in QCD“**

The first part of the submitted habilitation thesis is introduction which includes four chapters representing an overview of the studied topics. The main part of the dissertation consists from three Appendixes introducing a sample of the candidate's research work, published in internationally recognized peer-review journals. These are mainly publications of international collaborations H1 from HERA collider and ALICE from LHC collider at CERN, where the candidate was a member of the collaborations.

To the analyses of proton structure, Compton QCD scattering and forward jets as studied within H1 collaboration are devoted the publications of Appendix A. In Appendix B are presented four articles on phenomenology at low  $x$ , where candidate is the only author or he is the member of a small group of authors. In publications 8-9 is extracted the intercept of BFKL pomeron from the measured cross sections for forward jets by collaborations H1 and ZEUS, in 9th paper is proposed the extension of geometric scaling of the total  $\gamma^*p$  cross section. In the last publication of this Appendix was concluded (on the basis of studies of the structure function of the proton in the context of Balitsky-Kovchegov equation) that the saturation at HERA was probably not achieved yet. This article was not published but it was sent to JHEP journal.

Appendix C covers completely different research topic, heavy ion collisions as analyzed in the experiment ALICE at LHC. There the author as the member of the collaborations presents 6 publications covering different areas such as hardware (detector systems, trigger, measurement of the luminosity) and the first ALICE results obtained for the interactions p-Pb and Pb-Pb. The candidate is a member of the Ultra-peripheral-collision group of the ALICE collaboration. I found very positive that the candidate's work was recognised by a collaboration and he was named a convenor of that group.

The collection of presented articles is a solid and diversified set of important results in the field of particle physics. The obtained results are original and new. Moreover the candidate was nominated by collaborations to present many of these results in international workshops and conferences. I know from my own experience that his presentations were well accepted.

To conclude, the work performed by Dr. Contreras is important and successful in many different areas (data analysis, phenomenology and hardware) and was recognised in refereed publications.

Summarizing the above, the author definitely shows his skills in the area and I highly recommend his promotion to the rank „docent“ of Czech Technical University.

Prague, 1st of October, 2015

RNDr. Alice Valkárová, DrSc