

Referee's report

Title of habilitation thesis:

Jets in proton-proton and heavy ion collisions at the LHC

Author:

Martin Spousta

Reviewer:

J. G. Contreras

Recommendation:

Grant the promotion to docent

This habilitation thesis is divided in 6 chapters. In the Prologue, the author sets the framework of these studies, namely to use jets as a probe of QCD matter, particularly in the state called Quark Gluon Plasma which is produced in heavy-ion collisions at the LHC. Here, the author also describes the structure of the rest of the document and, most importantly, specifies his personal contributions to this field. Chapters 2 to 4, present an overview of the topics discussed in the scientific publications gathered in Chapter 6. In each section of Chapter 6 there is a small introductory paragraph, where the author specifies the level of his contributions to each of the papers included there. Chapter 5 gives a brief summary and provides an outlook.

The work reported in this thesis developed within the overall efforts of the ATLAS Collaboration. The author contributed to this effort since well before the first data was available, which allowed him to contribute to the definition of the physics program and to the preparation of the methods and tools needed, first to collect the data, and then to analyse it. The author contributed strongly to some of the first jet papers of ATLAS in pp collisions. Then, he used the acquired knowledge for the analysis of jet quenching in collisions of lead ions. The first results were presented in a landmark paper in the field. Several other papers exploring more in detail the behaviour of jets in Pb-Pb collisions followed this article. Recently the author has successfully started work on phenomenological aspects of jet quenching.

Something which I greatly appreciate from this thesis, is the work done in the technical aspects, like planning, developing tools or preparing triggers. As a member of a large collaboration myself, I know how crucial is this work. Without it, there would be no high quality data to be analysed.

Reading this thesis it is clear that the author has a clear understanding of the field, of the implications of the measurements and of potential directions to continue exploring QCD using jets as tools. He has strongly contributed to some very high quality papers, including a landmark paper in the field and he has explored, in phenomenology papers, the implication of these measurements. His overall knowledge has resulted in an invited review. I have no doubt, that from the academic point of view, this thesis largely fulfils the requirements to grant the author the promotion to docent.

doc. RNDr. J. G. Contreras

Prague, July 1st, 2017