

Posudek školitele na bakalářskou práci

Student: Helena Hesounová

Title: Multiplicity measurements in pp collisions with ALICE during the LHC Run 3

Supervisor: Guillermo Contreras

Grade: A (výborně)

This work presents experimental results obtained in the framework of the ALICE Collaboration. Originally, it was intended that Helena's thesis would be based on Monte Carlo generators, but in October 2021 the LHC provided pilot beam collisions which allowed Helena to also analyse real data for her thesis.

The work is structured in 4 chapters accompanied by a *Preface* and a *Summary*. The first chapter presents the basic concepts of the Standard Model and of QCD, to set the stage for the studies performed in this work. Chapter 2 presents the ALICE detector with special emphasis in the upgrades for the LHC Run 3 and the subsystems used later on. Chapter 3 describes two previous related measurements performed by the ALICE collaboration, and presents a phenomenological paper using this type of measurements to explore quantum entanglement. The main contribution of the work is presented in Chapter 4 where the the analysis of the first pilot beam data is described.

The work performed by Helena is very solid. It has to be stressed that many subsystems in ALICE are completely new. In addition, ALICE data are readout with a completely new paradigm for data acquisition. The main result of this thesis is that Helena managed to do a first (very) preliminary analysis of pilot beam data, running her programs under the new framework and identifying some detector issues (identified independently by the detector experts, and already corrected by them) ; she also performed a small new study where she compared the performance of the detector under different polarities of the ALICE magnets. All this was beyond the original task, which as stated above, dealt only with MC events. To perform such a challenging analysis at the bachelor level is quite an achievement which sets Helena in a prime position to perform a full analysis during her M. Sc. studies.

In summary, Helena Hesounová completed the requested work for her thesis, and then went well beyond the original tasks to analyse the first data collected by ALICE in the LHC Run 3. For this reason the note that I assign to this Bachelor Thesis is **A (výborně)**.

Guillermo Contreras,
Prague, July 18, 2022