

Title: Time resolution of TileCal and searches for heavy metastable particles

Author: Martina Pagáčová

Department: Institute of Particle and Nuclear Physics

Supervisor: Doc. RNDr. Rupert Leitner, DrSc.

Supervisor's e-mail address: Rupert.Leitner@cern.ch

Abstract: In the present work, the timing of the ATLAS TileCal is studied using the single hadron collision data. The time resolution and also the mean time response depend on the energy deposited in a given cell. The results are compared to the previous analysis with jets and muons. Precise time-of-flight measurement using TileCal can be used to identify the heavy long-lived particles predicted by the models of physics beyond the standard model. Their mass can be reconstructed by combining with the momentum measurement in the ATLAS inner detector. Finally, the mass resolution of an exotic particle with mass $M = 600$ GeV is estimated.

Keywords: ATLAS experiment, TileCal, time resolution, stable massive particles