

学位申請論文公開講演会

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場所： 物理会議室 (C-207)

題目： Search for Minimal Universal Extra Dimensions in the final state involving muons, jets and missing transverse energy in $\sqrt{s} = 8$ TeV pp collisions with the ATLAS detector

(ATLAS測定器による終状態にミュオン、ジェット、横方向損失エネルギーを含む余剰次元粒子の探索)

Abstract

The Minimal Universal Extra Dimensions (mUED) model is an extension of the Standard Model (SM) of particle physics which postulates the existence of one flat extra spatial dimension accessible to all the SM fields. Particles propagating in the compactified extra dimension form a tower of Kaluza-Klein (KK) states. Due to the symmetry called the KK-parity, the lightest KK-particle (LKP) is stable and is a plausible dark-matter candidate. The preferred mass of the dark-matter LKP lies at the TeV scale, making it accessible at the LHC.

In this work we present the search for mUED in $\sqrt{s} = 8$ TeV proton-proton collisions in the final state involving low momentum muons, jets and missing transverse energy. The dataset used corresponds to the integrated luminosity of 20.1 fb^{-1} delivered by the Large Hadron Collider (LHC) in 2012 and recorded with the ATLAS detector.

We perform a dedicated lepton selection optimization which results in a considerable improvement in the separation of signal (prompt) leptons from the non-prompt lepton background. We use various discriminating variables to separate the signal from the SM backgrounds and optimize the event selection in order to increase the signal-to-background ratio. The contribution of the main SM backgrounds to the signal region is estimated with a combination of data-driven and semi data-driven methods. No significant excess above the SM expectation is observed in the signal region. We place the most stringent limits on the LKP mass up to date in the region of the parameter space of interest.