Stopped Gluinos

Overview

The aim is to search for stable exotic massive hadrons which stop in the Calorimeter. In several SUSY scenarios, such as Split-SUSY, R-hadrons are expected, resulting in a stable gluino. Search strategies are based on gluinos stopping in the detector volume, and decaying out-of-time with the bunch crossing. Techniques to suppress backgrounds are developed using timing signatures in the calorimeter and signal candidate events are retained through the development of specific trigger algorithms. Backgrounds from cosmic muons are studied using the cosmic runs collected during first ATLAS data-taking. Further work is performed to understand the specific topologies and their detector signatures.

This is an early physics analysis which can be competitive to current limits with a luminosity of between 100pb-1 and 1fb-1 depending on the event selection and efficiency.

A more detailed, ATLAS only page, can be found here.

Related Papers

An Updated Description of Heavy-Hadron Interactions in GEANT4 - R. Mackeprang and D. A. Milstead (http://arxiv.org/abs/0908.1868)

R-hadrons in GEANT4 - http://r-hadrons.web.cern.ch/r-hadrons/

Interactions of heavy hadrons using Regge phenomenology and the quark-gluon string model - Y R de Boer, A B Kaidalov, D A Milstead and O I Piskounova (http://www.iop.org/EJ/abstract/0954-3899/35/7/075009/)

Stopping gluinos - A. Arvanitaki, S. Dimopoulos, A. Pierce, S. Rajendran and J. Wacker (Phys. Rev. D 76, 055007)

Search for Stopped Gluinos from p!p Collisions at sqrt(s) = 1.96 TeV - D0 Collaboration (PRL 99 131801)