

論文の内容の要旨

Search for Charginos Nearly Mass-Degenerate with the Lightest Neutralino Based on a Disappearing-Track Signature in pp Collisions at $\sqrt{s} = 8$ TeV

(重心系エネルギー 8TeV での陽子-陽子衝突における
消失飛跡検出法に基づいた最軽量ニュートラリーノと
質量が非常に縮退したチャージーノの探索)

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A search is presented for direct chargino production based on a disappearing-track signature using 20.3 fb^{-1} of proton-proton collisions at $\sqrt{s} = 8 \text{ TeV}$ collected with the ATLAS experiment at the Large Hadron Collider. In anomaly-mediated supersymmetry breaking (AMSB) models, the lightest chargino is nearly mass-degenerate with the lightest neutralino and its lifetime is long enough to be detected in the tracking detectors by identifying decays that result in tracks with no associated hits in the outer region of the tracking system. Other supersymmetric models with the pure neutral wino being the lightest supersymmetric particle also predict the same signature. This analysis attains sensitivity for charginos with a lifetime between 0.1 and 10 ns, and significantly surpasses the reach of the LEP experiments due to an enhanced track reconstruction efficiency for charginos having short decay length and a dedicated topological trigger to attain a higher signal efficiency. No significant excess above the background expectation is observed for candidate tracks with large transverse momentum, and constraints on chargino properties are obtained. In the AMSB scenarios, a chargino mass below 270 GeV is excluded at 95% confidence level, which also directly constrains the mass of wino dark matter.