



Contribution ID: 38

Type: **not specified**

R-parity Violation and Light Neutralinos at ANUBIS and MAPP (12'+3')

Thursday 19 November 2020 15:35 (15 minutes)

In R-parity-violating supersymmetry the lightest neutralino can be very light, even massless. For masses in the range 500 MeV to 4.5 GeV the neutralino can be produced in hadron collisions from rare meson decays via an R-parity violating coupling, and subsequently decay to a lighter meson and a charged lepton. Due to the small neutralino mass and for small R-parity violating coupling the lightest neutralino is long-lived, leading to displaced vertices at fixed-target and collider experiments. In this work, we study such signatures at the proposed experiments ANUBIS and MAPP at the LHC. We also compare their sensitivity reach in these scenarios with that of other present and proposed experiments at the LHC such as ATLAS, CODEX-b, and MATHUSLA. We find that ANUBIS and MAPP can show complementary or superior sensitivity.

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Session Classification: New ideas