ID de Contribution: **72** Type: **Ordinary**

Long-lived higgsinos as probes of gravitino dark matter at the LHC

lundi 4 mars 2013 10:55 (15 minutes)

An MSSM scenario in which two higgsino-like neutralinos and a higgsino-like chargino are light (of the order 100 GeV) and the other superparticles heavy (TeV-scale masses) is an interesting theoretical possibility. Such a spectrum can be obtained in GUT models and is consistent with a Higgs mass of $\sim$ 126 GeV and the absence of LHC signals for any other new physics so far.
Because the higgsinos are nearly mass degenerate and the strongly interacting superparticles are out of reach, such a scenario is difficult to probe at the LHC. The prospects change if we allow for a small amount of R-parity violation, which leads to a consistent cosmology with gravitino dark matter. The limits on decaying gravitino dark matter from gamma-ray searches with the Fermi-LAT put a lower bound on the higgsino NLSP decay length, giving rise to a displaced-vertex collider signature. I will present a detector-level study of the prospects for detection with the 8 TeV LHC data.

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Classification de Session: Top & Dark Matter

Classification de thématique: Theory