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Minimal Supergravity with $\mathbf{m_0^2 < 0}$ BRYAN SMITH, JONATHAN FENG, ARVIND RAJARAMAN, University of California, Irvine — We extend the parameter space of minimal supergravity to negative values of m_0^2, the universal scalar mass parameter defined at the grand unified scale. After evolving to the weak scale, all scalars can be non-tachyonic with masses consistent with collider constraints. This region of parameter space is typically considered excluded by searches for charged dark matter, since the lightest standard model superpartner is a charged slepton. However, if the gravitino is the lightest supersymmetric particle, the charged slepton decays, and this region is allowed. This region provides qualitatively new possibilities for minimal supergravity, including spectra with light sleptons and very heavy squarks, and models in which the lightest slepton is the selectron. We show that the $m_0^2 < 0$ region is consistent with low energy precision data and discuss its implications for particle colliders. These models may provide signals of supersymmetry in even the first year of operation at the Large Hadron Collider.

Bryan Smith
Unversity of California, Irvine

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