

Supersymmetric Candidates for Dark Matter

The identity of dark matter is one of the greatest puzzles of our Universe. Its solution may be associated with supersymmetry which is a fundamental space-time symmetry that has not been verified experimentally so far. In many supersymmetric extensions of the Standard Model of particle physics, the lightest supersymmetric particle cannot decay and is hence a promising dark matter candidate. The lightest neutralino, which appears already in the minimal supersymmetric model, can be identified as such a candidate in indirect and direct dark matter searches and at future colliders. As the superpartner of the graviton, the gravitino is another candidate for the lightest superparticle that provides a compelling explanation of dark matter. While it will neither be detected in indirect or direct searches nor be produced directly at accelerators, the analysis of late-decaying charged particles can allow for an experimental identification of the gravitino at future accelerators. In this way, the upcoming experiments at the CERN Large Hadron Collider may become a key to the understanding of our Universe.