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Searches for Long-lived particles and displaced vertices with the ATLAS experiment

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The discovery of a new type of a heavy long-lived particle (LLP) would be of fundamental significance, since no such particles exist in the Standard Model. LLPs are anticipated in a wide range of physics models which extend the Standard Model, such as supersymmetry (SUSY) and universal extra dimensions. Since LLPs produced in the 7 TeV pp collisions at the CERN LHC can be slow (beta«1) and penetrating, time-of-flight and anomalous dE/dx energy loss measurements are promising ways to search for LLPs, in the cases where they are charged. We also report on a search for heavy particles whose decay takes place a significant distance from their production point. Production of such particles is expected in various new-physics scenarios, a well motivated example of which is supersymmetry with R-parity violation. Searches using the ATLAS experiment are presented, with the techniques and results described.

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