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Searches for long-lived particle decays in ATLAS

Searches for the decay of neutral, weakly interacting, long-lived particles using data collected by the ATLAS detector at the LHC are presented. These analyses use the full dataset recorded in 2012: 20.3 fb⁻¹ of proton–proton collision data at $\sqrt{s}=8$ TeV. The first analysis is sensitive to long-lived particles that decay to Standard Model particles producing jets at the outer edge of the ATLAS electromagnetic calorimeter or inside the hadronic calorimeter. The second search employs techniques for reconstructing decay vertices of long-lived particles decaying to jets in the inner tracking detector and muon spectrometer. Signal events require at least two reconstructed vertices. No significant excess of events over the expected background are found, and limits as a function of proper lifetime are reported for the decay of the Higgs boson and other scalar bosons to long-lived particles and for Hidden Valley Z' and Stealth SUSY benchmark models.

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