

Abstract Submitted
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Search for New Physics in Long-Lived Particles that Decay to Photons RISHI PATEL, Cyclotron Institute Texas A&M University, DAVID TOBACK, Texas A&M University — We look for beyond Standard Model physics using a Gauge Mediated Supersymmetry Model, which predicts events where a neutralino decays to a photon and a gravitino. We use the new EMTiming system at the Collider detector at Fermilab to measure the delay in the photon arrival time from the Standard Model predicted photon. Depending on the exclusion region of the neutralino mass, the gravitino can be a warm dark matter candidate. We extend the GMSB by a few GeV/c^2 getting closer to a cosmology region where the gravitino mass is such that it is possible for it to have been thermally produced in the early universe. If the gravitinos are too light ($<1 \text{ keV}/c^2$) then they can destroy the nuclei produced during the Big Bang Nucleosynthesis and can lead to a cosmic microwave background that is different from observations. If they are heavy ($>1 \text{ keV}/c^2$) then, while they are a warm dark matter candidate, their density can cause the universe to overclose if there is no dilution mechanism.

Rishi Patel
Cyclotron Institute Texas A&M University

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