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A search for long lived neutral particles decaying to photons at the ATLAS detector

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Long lived neutral particles that decay within the volume of a particle detector to a photon and a dark matter candidate will leave a unique signature which cannot be explained by any Standard Model process providing clear evidence of new physics.

This talk will present an analysis performed on the data collected by the ATLAS Collaboration in 2011 at a center of mass energy of 7TeV searching for events containing two photons and a large amount of missing energy from the decay of long lived neutral particles. The results are interpreted in terms of Gauge Mediated Symmetry Breaking where the lightest neutralino is the long lived neutral particle which decays to a photon and a gravitino, the lightest Supersymmetric particle and dark matter candidate. Limits are set on the mass and the lifetime of the lightest neutralino. Improvements made to the method being used to analyse the 8TeV center of mass data collected in 2012 and preliminary results will also be presented.

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