

# Detecting metastable staus and gravitinos at the ILC

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We present a study of various SUSY scenarios in which the lightest supersymmetric particle (LSP) is the gravitino and the next-to-lightest supersymmetric particle (NLSP) is a metastable stau with lifetimes ranging from seconds up to several years. At the ILC such heavy staus are copiously produced either directly or through cascade decays. A proper choice of the cms energy allows one to stop large samples in the calorimeters of the ILC detector and subsequently study the decays of stau  $\rightarrow$  photon + gravitino. A detailed simulation shows that the properties of the stau and the gravitino, such as lifetimes and masses, can be accurately determined at a future linear collider. Heavy gravitinos are interesting dark matter candidates which cannot be directly detected in astrophysical experiments.

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