

Stau Searches at the ILC

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“The direct pair-production of the tau-lepton superpartner, stau, is one of the most interesting channels to search for SUSY. First of all the stau is with high probability the lightest of the scalar leptons. Secondly the signature of stau pair production signal events is one of the most difficult ones, yielding to the ‘worst’ and so most global scenario for the searches. The current model-independent stau limits comes from analysis performed at LEP but they suffer from the low energy of this facility. The LHC exclusion reach extends to higher masses for large mass differences, but under strong model assumptions.

The ILC, a future electron-positron collider with energy up to 1 TeV, is a promising scenario for SUSY searches. The capability of the ILC for determining exclusion/discovery limits for the stau in a model-independent way is shown in this contribution, together with an overview of the current state-of-the-art. A detailed study of the ‘worst’ scenario for stau exclusion/discovery, taking into account the effect of the stau mixing on stau production cross-section and efficiency, is presented. The study also includes an analysis of the effect of overlay particles in stau searches. The studies were done using the sgx fast simulation adapted to the ILD detector concept at the ILC.”

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