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## Stau searches at future e+e- colliders

The direct pair-production of the superpartner of the  $\tau$ -lepton, the  $\tilde{\tau}$ , is one of the most interesting channels to search for SUSY in: the  $\widetilde{\tau}$  is likely to be the lightest of the scalar leptons, and is one of the most experimentally challennging ones. The current model-independent  $\widetilde{\tau}$  limits come from LEP, while limits obtained at the LHC do extend to higher masses, but are model-dependent. The future Higgs factories will be powerful facilities for SUSY searches, offering advantages with respect to previous electron-positron colliders as well as to hadron machines. In order to quantify the capabilities of these future  $e^+e^-$  colliders, the "worst-case" scenario for  $\tilde{\tau}$  exclusion/discovery has been studied, taking into account the effect of the  $\widetilde{\tau}$  mixing on  $\widetilde{\tau}$  production cross-section and detection efficiency. To evaluate the latter, the ILD concept, originally developed for the International Linear Collider (ILC), and the ILC beam conditions at a centre-of-mass energy of 500\,GeV have been used for detailed simulations. The obtained exclusion and discovery reaches extend to only a few GeV below the kinematic limit even in the worst-case scenario. A recast of the results of the detailed simulation study to ILC at different CM energies, and to the experimental environment of other proposed Higgs factory projects is also presented.

## Secondary track

Authors: LIST, Jenny (DESY); NÚÑEZ PARDO DE VERA, María Teresa (DESY); Dr BERGGREN, Mikael (DESY)

Presenter: NÚÑEZ PARDO DE VERA, María Teresa (DESY)

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