

Discovering bottom squark coannihilation at the ILC

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We study the potential of the international linear collider (ILC) at $\sqrt{s}=500$ GeV to probe new dark matter motivated scenario where the bottom squark (sbottom) is the next-to-lightest supersymmetric particle. For this scenario, which is virtually impossible for the LHC to test, the ILC has a potential to cover a large fraction of the parameter space. The challenge is due to a very low energy of jets, below 20–30 GeV, which pushes the jet clustering and flavor tagging algorithms to their limits. The process of sbottom pair production was studied within the SiD detector concept. We demonstrate that ILC offers a unique opportunity to test the supersymmetry parameter space motivated by the sbottom-neutralino coannihilation scenario in cases when the sbottom production is kinematically accessible. The study was done with the full SiD simulation and reconstruction chain including all standard model and beam backgrounds.

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