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Stop-Higgsino Associated Production at a 100 TeV Collider

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Light stops and Higgsinos are preferred in supersymmetry from electroweak naturalness considerations. In a well-motivated region of parameter space, stops are significantly heavier than Higgsinos, and the cross section for stop-Higgsino associated production can be significant due to the large top Yukawa coupling. In this case, searches for associated production can compete with traditional searches for stop pair production. Conversely, stop-Higgsino associated production can improve the Higgsino mass reach of future colliders even if the stop is much heavier than the Higgsino, as well as probe the thermal Higgsino dark matter scenario at a 100 TeV collider. We consider the top + jet + MET final state arising from stop-Higgsino associated production, and perform a boosted decision tree analysis at a 100 TeV proton-proton machine. We comment on the implications of the results for top tagging standards at future detectors.

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