Target decay

- Simplified model
- 2 light sparticles: stop $\tilde{t}$ and neutralino $\tilde{\chi}^0$
- $\tilde{\chi}^0$ is assumed to be the lightest supersymmetric particle (LSP)
- LSP provides a dark matter candidate
- Assuming a pure bino LSP

Search strategy

- Direct decay into top quark and neutralino
- "Diagonal" region ($m_{\tilde{t}} \sim m_t$)
- 3-body decay to b-jet, W and $\tilde{\chi}^0$
- 4-body decay to b-jet, 2 fermions and $\tilde{\chi}^0$

Signal extraction and background estimation

1L or 2L $t\bar{t}$ processes are dominant in all SRs

- Exploit boosted top quark topology to define SR and CR
- Challenging due to similarity to $t\bar{t}$
- 3 BDTs to discriminate signal
- Shape fit in high BDT output score
- Dominated by 2L $t\bar{t}$
- Shape fit in am\_T1
- Hadronic "top-tag" CR
- Shape fit in $p_T^{\text{lepton}}/E_{T\text{miss}}$

Results and Interpretation

- Data and SM background is in good agreement
- Exclusion limits determined for signal models in the $m_1 - m_2$ plane

Find out more:
ATLAS-CONF-2017-037
https://cds.cern.ch/record/2266170

References: