**Top physics at ATLAS**

**Motivation**
Direct measurement of $\sigma_0$ search for anomalous top couplings/polarization, search for 4th generation

**Main method**
cross-checked with NN (lepton+jets) w/ 1 b-tag

**Charge asymmetry**
Hot topic: Significant deviation from SM observed at Tevatron for large $m_t$.
Small asymmetry predicted due to interference of gluon emission in q\(\rightarrow\)lqg and q\(\rightarrow\)lqg gluon fusion and one-loop diagrams $\rightarrow$ $\bar{t}$. Top emitted preferentially in the direction of the incoming quark. Measure rapidity difference of top and antitop $\Delta y$.

**Spin correlations**
Short lifetime of top quark. Decays before spin can be flipped by strong interaction.
Spin information can be accessed via angular distributions of decay products. Deviation from QCD prediction would indicate new physics. $\rightarrow$ $-b$

**W helicity in top decay**

**Search for $t\bar{t}$ + missing $E_T$**

**Search for $t\bar{t}$ resonances**

**Mass**
Reduce JES uncertainty, by fitting simultaneously $m_{WW}$ and $m_{Z}/$template
$m_{WW}$ and reconstruction
Loop on all (q) triplets with 50 GeV, $m_{WW}$ = 110 GeV. Choose the triplet maximizing $p_{T}$ for $m_{WW}$ and the corresponding light jet pair for $m_{Z}/T$.
For $m_{WW}$, improve the resolution by rescaling $(qT)$ light jets energy according to a measurement of $m_{WW}$ to $m_{t\bar{t}}$

**Systematic uncertainties**
Data-driven (9%), JES, b-tagging, ISR/FSR

**W+jets channel**

**s-channel**
Motivation: search for tb resonances ($W$, charged Higgs, KK $W$ excitation), process not observed yet at Tevatron.
Method: cut-based analysis in lepton + 2 jet channel w/ 2 identified b-jets

**Signal extraction**

Boosted Decision Tree $t\bar{t}$ identification

**Complementary analysis**

**Method**
cut-based analysis in di-lepton + 1 jet

**Signal region**

**Spin observables**

**MC generation**

**W+jets channel**

**Signal extraction**

Boosted Decision Tree $t\bar{t}$ identification

**Main uncertainties**
Data statistics (3%), JES, luminosity, b-tagging efficiency (~5% each)

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