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Top quark pair properties - spin correlations, top quark pair asymmetry and complex final states using the ATLAS detector at the LHC

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Summary

In proton-proton collisions at the LHC, pairs of top and anti-top quarks are expected to be mostly produced through gluon fusion. Making use of the large number of top quark pairs collected in the 7 TeV data, we present measurements of the spin correlation between top and anti-top quarks using several variables and discuss their sensitivity to new physics.
In addition, we present measurements of the top quark polarisation predicted in models with CP-conserving and CP-violating processes. A top pair-enriched sample of events with a single lepton (electron or muon), missing transverse momentum and at least four high transverse momentum jets, of which at least one is tagged as coming from a b-quark, is used to measure tt production charge asymmetry to Ac=0.006 +/- 0.010.
Differential Ac measurements as a function of the invariant mass, the rapidity and the transverse momentum of the tt-system are also presented.
In addition, Ac is measured for a subset of events with large tt velocity, where physics beyond the Standard Model could contribute. All measurements are consistent with the Standard Model predictions.

Presenter: ZHU, Chengguang (Shandong, China)

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