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Title : B-jet energy scale calibration using top-antitop lepton+jets events in ATLAS

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ATLAS is a multi-purpose detector designed to probe Standard Model predictions, perform precision measurements and search for hints of new Physics. It measures energies, momentum and trajectories of particles produced by proton-proton collisions at high center-of-mass energies ($\sqrt{s} = 13$ TeV).

The calibration in energy of ATLAS is therefore crucial especially for b-jets that are very important in many searches and measurements such as the main decay of the Higgs boson into pairs of b-quarks ($\mathrm{H} \to \mathrm{b\bar{b}}$).

The b-jet energy scale (b-JES) is currently estimated from comparing the b-jets response in different Monte-Carlo simulation samples and is often one of the main sources of experimental uncertainty.

Due to the high cross-section of top pair production at LHC and the large branching ratio of $\mathrm{t\bar{t}} \to$ lepton+jets events ($\mathrm{t\bar{t}} \to \mathrm{b}qq' + \mathrm{b}\ell\nu$), b-JES calibration can be carried out comparing data and MC predictions with the so called template method by reconstructing the invariant mass of the hadronically decaying top quark.

This never performed study in ATLAS will enable to correct energy of b-jets in data depending on their transverse momentum/pseudorapidity, determine the associated uncertainties and explore higher momentum regions than other ongoing studies as for instance $\mathrm{Z} + \mathrm{b}$ balanced systems.