

## T 101: Top Quark V (Wirkungsquerschnitte)

Zeit: Donnerstag 16:45–18:45

Raum: VMP9 HS

T 101.1 Do 16:45 VMP9 HS

**Measurements of jets produced in top quark events using the di-lepton final state with 2 b-tagged jets in pp collisions at a centre-of-mass energy of 13 TeV with the ATLAS detector** — ●CHRISTOPH ECKARDT — DESY, Zeuthen, Deutschland

In this talk the measurements of the normalized differential cross-sections of top-quark pair production are presented at a centre-of-mass energy of 13 TeV with the ATLAS detector. The  $t\bar{t}$  production with additional jets is a dominant background to the measurements of certain Higgs boson production processes and decay modes and to many searches for new physics phenomena. The aim of this analysis is to test Monte Carlo predictions by making a direct measurement of jet activity in  $t\bar{t}$  events. The measurements use events with a pair of oppositely charged leptons and two b-tagged jets in the final state. The data are corrected to obtain the particle-level fiducial cross sections.

T 101.2 Do 17:00 VMP9 HS

**$t\bar{t}$  cross section measurement in the semi-leptonic channel at 8 TeV with the ATLAS Experiment** — ●ARWA BANNOURA and PETER MÄTTIG — Bergische Universität Wuppertal, Wuppertal, Germany

A precise measurement of the top quark properties is of great importance. In this analysis, the top pair production cross section in the semi-leptonic channel is measured using event shape based observables that discriminate  $t\bar{t}$  events from the backgrounds. These variables are fed into an artificial neural network (ANN) in order to improve the separation strength between the signal and the backgrounds. The ANN output templates for all processes are then fitted to data using a binned maximum likelihood method. In this context, the main background which is  $W + \text{jets}$  is estimated completely from data using a new approach. Also, new ideas are proposed to constrain systematic uncertainties in order to improve the precision of the measurement.

T 101.3 Do 17:15 VMP9 HS

**Messung des  $t\bar{t}$ -Wirkungsquerschnitts bei 13 TeV am LHC** — ●ANDRE SCHMALFELD, PETER SCHLEPER, HARTMUT STADIE, FRED STOBER, CHRISTOPH GARBERS und NATALIA KOVALCHUK — Institut für Experimentalphysik, Hamburg, Deutschland

Die Messung des differentiellen Wirkungsquerschnitts von Topquarkpaaren ist von großer Bedeutung für die Überprüfung von Vorhersagen der Quantenchromodynamik (QCD) und für die Suche nach Physik jenseits des Standardmodells (SM). Die Bestimmung des inklusiven und differentiellen Wirkungsquerschnitts von Topquarkpaaren im semileptonischen Zerfallskanal bei einer Schwerpunktsenergie von 13 TeV wird in diesem Vortrag präsentiert. Die untersuchten Daten wurden mit dem Compact Muon Solenoid (CMS) Experiment am Large Hadron Collider (LHC) aufgenommen und mit einem kinematischen Fit rekonstruiert. Um eine hohe Reinheit zu gewährleisten, wird die Güte des Fits als Selektionskriterium verwendet.

T 101.4 Do 17:30 VMP9 HS

**Measurement of the top-quark pair production cross section in the dilepton channel at a center of mass energy of 13 TeV with the CMS detector** — ●TILL ARNDT, MARIA ALDAYA, CARMEN DIEZ PARDOS, ALEXANDER GROHSJEAN, ALI HARB, JOHANNES HAUKE, JAN KIESELER, ANDREAS MEYER, ELENI NTOMARI, and MYKOLA SAVITSKYI — Deutsches Elektronen-Synchrotron (DESY), Notkestrasse 85, D-22607 Hamburg

Since the discovery of the top quark in 1995 at the Fermilab Tevatron collider, the top-quark pair production cross section has been measured with ever higher precision. Until now, no deviation from the standard model prediction has been found. However, the  $t\bar{t}$  cross section remains one of the most important parameters to be measured in top physics. We present results for the top-quark pair production cross section at a center of mass energy of  $\sqrt{s} = 13$  TeV using data taken by the CMS detector in 2015. Special attention will be given to the discussion of experimental uncertainties.

T 101.5 Do 17:45 VMP9 HS

**Measurement of the inclusive top-quark pair cross section in the dilepton channel at 13 TeV with the CMS experiment** —

●ALI HARB, MARIA ALDAYA, TILL ARNDT, CARMEN DIEZ PARDOS, ALEXANDER GROHSJEAN, JOHANNES HAUKE, ELENI NTOMARI, and MYKOLA SAVITSKYI — Deutsches Elektronen Synchrotron (DESY), Hamburg, Germany

The top quark is the heaviest known fundamental particle which is primarily produced in quark-antiquark pairs ( $t\bar{t}$ ) at the Large Hadron Collider (LHC). It decays almost exclusively to a b quark and a W boson. The final-state topology in the  $t\bar{t}$  system is governed by the W boson decay mode. In this talk, the measurement of the top quark pair cross-section in the dilepton channel using a cut-and-count method will be presented. The dataset used for this measurement corresponds to an integrated luminosity of  $2.1 \text{ fb}^{-1}$  collected by the Compact Muon Solenoid (CMS) experiment at a center-of-mass energy  $\sqrt{s} = 13$  TeV.

T 101.6 Do 18:00 VMP9 HS

**Measurements of differential top cross-sections in the dilepton channel at 13 TeV with the ATLAS experiment** — ●ABIGAIL O’ROURKE — DESY, Hamburg, Deutschland

Run 2 of the LHC allows the top quark pair production cross section to be measured at a centre of mass energy of 13 TeV. The higher centre of mass energy allows more precise measurement of differential cross-sections. These differential cross-section measurements provide a test of the Standard Model and are sensitive to possible beyond the Standard Model physics. The  $3.2 \text{ fb}^{-1}$  of data provided by the ATLAS experiment in 2015 allows the measurement of the differential cross-section as functions of the kinematic variables of the  $t\bar{t}$  system. Studies of these differential cross-section measurements are presented here in the dilepton channel.

T 101.7 Do 18:15 VMP9 HS

**Measurement of the differential  $t\bar{t}$  production cross section as a function of the jet mass in fully merged top quark decays in CMS** — ●TORBEN DREYER, JOHANNES HALLER, and ROMAN KOGLER — Institut für Experimentalphysik, Universität Hamburg

The decay products of hadronically decaying top quarks are collimated into a single jet, if the top quarks are produced with high transverse momenta. In this case it is possible to reconstruct large jets containing a full hadronic top quark decay. The invariant mass of such jets is sensitive to the mass of the top quark itself and is calculable theoretically. A comparison to theory calculations could lead to an extraction of the top quark mass in a well defined renormalization scheme.

In this contribution a measurement of the differential  $t\bar{t}$  production cross section as a function of the jet mass is presented. The measurement is performed in the lepton+jets decay channel with data collected by the CMS detector in proton-proton collisions at a center of mass energy of 8 TeV. Events are selected with transverse jet momenta greater than 400 GeV to select fully merged top quark decays. To allow a comparison to theory calculations the data is corrected for detector effects using a regularized unfolding method.

T 101.8 Do 18:30 VMP9 HS

**Measurement of the differential cross section for top-quark pair production in the dilepton channel at 13 TeV with the CMS detector** — ●MYKOLA SAVITSKYI, MARIA ALDAYA, TILL ARNDT, CARMEN DIEZ PARDOS, ALEXANDER GROHSJEAN, ALI HARB, JOHANNES HAUKE, and ELENI NTOMARI — Deutsches Elektronen-Synchrotron (DESY), Notkestrasse 85, D-22607 Hamburg

In this talk we present measurements of the normalized differential top quark pair ( $t\bar{t}$ ) production cross section at 13 TeV with the CMS detector using final states with two leptons ( $e^+e^-$ ,  $\mu^+\mu^-$ , and  $e^\pm\mu^\mp$ ). The  $t\bar{t}$  production cross section is measured as a function of kinematic properties of the top quarks and the  $t\bar{t}$  system in the full phase space, as well as of the jet multiplicity in the event in the fiducial phase space. Several Standard Model Monte Carlo predictions are confronted with the data.