

- **Measurement of the Top Pair Production Cross Section in the Electron+Jets Channel at DØ Using Topological Information**

Author: Jean-Roch Vlimant

Affiliation: LPNHE, France

E-mail: vlimant@lpnhp.in2p3.fr

Sorting Category: F6 (Heavy Quarks)

Abstract: Measurement of the top quark pair ($t\bar{t}$) production cross section at hadron colliders can be used to test perturbative QCD predictions. Within the Standard Model, the top quark almost always decays to a W boson and a b quark. We present a measurement of the $t\bar{t}$ production cross section at $\sqrt{s} = 1.96$ TeV in $p\bar{p}$ collisions using approximately 370 pb^{-1} of data collected by the DØ experiment during Run II of the Fermilab Tevatron collider. This measurement is performed in the electron+jets final state and exploits the differences in event topology between the $t\bar{t}$ signal and the background.

- **Measurement of the Top Pair Production Cross Section in the Muon+Jets Channel at DØ Using Topological Information**

Author: Nils Gollub

Affiliation: Uppsala University, Sweden

E-mail: gollub@fnal.gov

Sorting Category: F6 (Heavy Quarks)

Abstract: Measurement of the top quark pair ($t\bar{t}$) production cross section at hadron colliders can be used to test perturbative QCD predictions. Within the Standard Model, the top quark almost always decays to a W boson and a b quark. We present a measurement of the $t\bar{t}$ production cross section at $\sqrt{s} = 1.96$ TeV in $p\bar{p}$ collisions using approximately 370 pb^{-1} of data collected by the DØ experiment during Run II of the Fermilab Tevatron collider. This measurement is performed in the muon+jets final state and exploits the differences in event topology between the $t\bar{t}$ signal and the background.

- **Measurement of the Top Pair Production Cross Section in Lepton+Jets Final States at DØ Using Lifetime b-Tagging**

Author: Gustavo J. Otero y Garzon

Affiliation: University of Illinois at Chicago, USA

E-mail: gotero@fnal.gov

Sorting Category: F6 (Heavy Quarks)

Abstract: Measurement of the top quark pair ($t\bar{t}$) production cross section at hadron colliders can be used to test perturbative QCD predictions. Within the Standard Model, the top quark almost always decays to a W boson and a b quark. We present a measurement of the $t\bar{t}$ production cross section at $\sqrt{s} = 1.96$ TeV in $p\bar{p}$ collisions using approximately 230 pb^{-1} of data collected by the DØ experiment during Run II of the Fermilab Tevatron collider. The $t\bar{t}$ production cross section is measured in lepton+jets final states based on the application of two different lifetime-tagging techniques.

- **Measurement of the Top Quark Pair Production Cross Section in the Di-Electron+Jets Channel at DØ**

Author: Ashish Kumar

Affiliation: University of Delhi, India

E-mail: ashishk@fnal.gov

Sorting Category: F6 (Heavy Quarks)

Abstract: Measurement of the top quark pair ($t\bar{t}$) production cross section at hadron colliders can be used to test perturbative QCD predictions. Within the Standard Model, the top quark almost always decays to a W boson and a b quark. We present a measurement of the $t\bar{t}$ production cross section at $\sqrt{s} = 1.96$ TeV in $p\bar{p}$ collisions using about 370 pb^{-1} of data collected by the DØ experiment during Run II of the Fermilab Tevatron collider. We consider the di-electron+jets final state and discuss the selection criteria, efficiencies and background contributions.

- **Measurement of the Top Quark Pair Production Cross Section in the Di-Muon+Jets Channel at DØ**

Author: Jessica Leveque

Affiliation: University of Arizona, USA

E-mail: leveque@fnal.gov

Sorting Category: F6 (Heavy Quarks)

Abstract: Measurement of the top quark pair ($t\bar{t}$) production cross section at hadron colliders can be used to test perturbative QCD predictions. Within the Standard Model, the top quark almost always decays to a W boson and a b quark. We present a measurement of the $t\bar{t}$ production cross section at $\sqrt{s} = 1.96$ TeV in $p\bar{p}$ collisions using data collected by the DØ experiment during Run II of the Fermilab Tevatron collider. We consider the di-muon+jets final state and discuss the selection criteria, efficiencies and background contributions.

- **Measurement of the Top Quark Pair Production Cross Section in the Electron+Muon+Jets Channel at DØ**

Author: Kirti Ranjan

Affiliation: University of Delhi, India

E-mail: kirti@fnal.gov

Sorting Category: F6 (Heavy Quarks)

Abstract: Measurement of the top quark pair ($t\bar{t}$) production cross section at hadron colliders can be used to test perturbative QCD predictions. Within the Standard Model, the top quark almost always decays to a W boson and a b quark. We present a measurement of the $t\bar{t}$ production cross section at $\sqrt{s} = 1.96$ TeV in $p\bar{p}$ collisions using data collected by the DØ experiment during Run II of the Fermilab Tevatron collider. We consider the electron+muon+jets final state and discuss the selection criteria, efficiencies and background contributions.

- **Measurement of the Top Quark Pair Production Cross Section in the All-Hadronic Channel at DØ**

Author: Hendrik Hoeth

Affiliation: University of Wuppertal, Germany

E-mail: hoeth@physik.uni-wuppertal.de

Sorting Category: F6 (Heavy Quarks)

Abstract: Measurement of the top quark pair ($t\bar{t}$) production cross section at hadron colliders can be used to test perturbative QCD predictions. Within the Standard Model, the top quark almost always decays to a W boson and a b quark. We present studies for the measurement of the $t\bar{t}$ production cross section at $\sqrt{s} = 1.96$ TeV in $p\bar{p}$ collisions using data collected by the DØ experiment during Run II of the Fermilab Tevatron collider. We consider the all-hadronic channel, characterized by six jets (two of them b jets) in the final state, and discuss the techniques being developed for an optimal separation between signal and the overwhelming QCD multijet background. These involve b -tagging by means of a secondary vertex tagger, as well as Neural Networks to exploit the differences between signal and background in event topology.

- **Measurement of the Top Quark Mass in the Electron+Muon+Jets Decay Channel at DØ**

Author: Jeff Temple

Affiliation: University of Arizona, USA

E-mail: jtemple@physics.arizona.edu

Sorting Category: F6 (Heavy Quarks)

Abstract: The top quark mass is one of the fundamental parameters of the Standard Model. We present a preliminary measurement of the top quark mass in the electron+muon+jets decay channel of $t\bar{t}$ events, using data collected by the DØ experiment during Run II of the Fermilab Tevatron collider. The method used for the top quark mass determination, called the “neutrino weighting scheme”, makes use of the sensitivity of the neutrino rapidity distribution to the top quark mass. Systematic errors associated with this measurement are also discussed.

- **A Method for the Determination of the Top Quark Mass in the Dilepton+Jets Channel at DØ**

Author: Petr Homola

Affiliation: Czech Technical University in Prague, Czech Republic

E-mail: phomola@fnal.gov

Sorting Category: F6 (Heavy Quarks)

Abstract: We present a method for the determination of the mass of the top quark in the dilepton+jets final state based on full reconstruction of the $t\bar{t}$ system and weighting of the obtained solutions according to their consistency with the expected transverse momenta of the top quarks and neutrinos. This method has been successfully applied to Monte Carlo simulations of data from the ATLAS experiment. A discussion on the expected performance of this method when applied to dilepton+jets samples selected by the DØ experiment in Run II will also be given.

- **Measurement of the Top Quark Mass in $D\bar{D}$ using the Ideogram Method**

Author: Martijn Mulders

Affiliation: Fermi National Accelerator Laboratory, USA

E-mail: mulders@fnal.gov

Sorting Category: F6 (Heavy Quarks)

Abstract: The top quark mass is one of the fundamental parameters of the Standard Model. At a hadron collider, top quarks are dominantly produced in pairs ($t\bar{t}$), each of them decaying to a W boson and a b quark. We report on the measurement of the mass of the top quark in the lepton+jets final state, using data collected by the $D\bar{D}$ experiment during Run II of the Fermilab Tevatron collider. The top quark mass is determined by using the so-called “Ideogram Method”, based on constrained kinematic fitting, but designed to make optimal use of the available information: it build a per-event likelihood taking into account all possible jet permutations, the possibility that the event was background, and the estimated error on the fitted mass for each jet permutation. Information from a b -tagging algorithm is also used to further improve the separation between signal and backgrounds. A discussion will also be given on recent progress in the understanding of systematic uncertainties in the top quark measurement.

- **Measurement of the Top Quark Mass in the Lepton+Jets Channel at $D\bar{D}$ using a Matrix Element-Based Method**

Author: Philipp Schieferdecker

Affiliation: LMU Munich, Germany

E-mail: schiefer@fnal.gov

Sorting Category: F6 (Heavy Quarks)

Abstract: The top quark mass is one of the fundamental parameters of the Standard Model. At a hadron collider, top quarks are dominantly produced in pairs ($t\bar{t}$), each of them decaying to a W boson and a b quark. We report on the measurement of the mass of the top quark in the lepton+jets final state, using data collected by the $D\bar{D}$ experiment during Run II of the Fermilab Tevatron collider. The top quark mass is extracted by making use of an event-by-event likelihood built from the matrix elements for signal and background and the detector resolution for the reconstructed decay products, thus making an extensive use of the available statistical information. This method was first applied to the Run I dataset to measure the top quark mass at $D\bar{D}$ and led to a substantially reduced statistical uncertainty with respect to previous methods.

- **Measurement of the Top Quark Mass in the Lepton+Jets Channel at $D\bar{D}$ using a Matrix Element-Based Method and Secondary Vertex Tagging**

Author: Robert Harrington

Affiliation: Northeastern University, USA

E-mail: harringt@fnal.gov

Sorting Category: F6 (Heavy Quarks)

Abstract: The top quark mass is one of the fundamental parameters of the Standard Model. At a hadron collider, top quarks are dominantly produced in pairs ($t\bar{t}$), each of them decaying to a W boson and a b quark. We report on the measurement of the mass of the top quark in the lepton+jets final state, using data collected by the $D\bar{D}$ experiment during Run II of the Fermilab Tevatron collider. The top quark mass is extracted by making use of an event-by-event likelihood built from the matrix elements for signal

and background and the detector resolution for the reconstructed decay products, thus making an extensive use of the available statistical information. This method was first applied to the Run I dataset to measure the top quark mass at DØ and led to a substantially reduced statistical uncertainty with respect to previous methods. The method is further enhanced through secondary vertex tagging, which allows selection of events more likely to have contained b -quarks due to the presence of displaced vertices. This technique greatly enhances the purity of the data sample, allowing a potentially more precise measurement of the top quark mass.

- **Search for Right-Handed Helicity W Bosons in Top Quark Decays at DØ**

Author: Bryan Gmyrek

Affiliation: University of Arizona, USA

E-mail: gmyrek@fnal.gov

Sorting Category: F6 (Heavy Quarks)

Abstract: Within the Standard Model, the helicity of the W boson in the top quark decay is given by the V–A coupling. As the top quark is by far the heaviest of all fermions, some models predict an additional V+A coupling between the top quark and the W boson. At a hadron collider, top quarks are dominantly produced in pairs ($t\bar{t}$), each of them decaying to a W boson and a b quark. We present a search for right-handed helicity W bosons in top quark decays using the lepton+jets decay channel. The data were collected by the DØ experiment during Run II of the Fermilab Tevatron. The W boson helicity is determined using the angular distribution of the lepton in the W rest-frame with respect to the W direction. A limit on the fraction of right-handed W bosons is reported along with a discussion of systematic uncertainties.

- **Measurement of the Top Quark Transverse Momentum Spectrum at DØ**

Author: Jiri Kvita

Affiliation: Institute of Physics of Czech Academy of Sciences, Czech Republic

E-mail: kvita@fnal.gov

Sorting Category: F6 (Heavy Quarks)

Abstract: We present a measurement of the transverse momentum spectrum of top quarks produced in pairs ($t\bar{t}$) in $p\bar{p}$ collisions. This spectrum is sensitive to potential contributions from non-standard $t\bar{t}$ production mechanisms. Within the Standard Model the top quark decays into a W boson and a b almost 100% of the time. In this analysis we consider $t\bar{t}$ candidates selected in the lepton+jets final state, from data collected by the DØ experiment during Run II of the Fermilab Tevatron collider. To optimize the resolution of the transverse momentum measurement, we perform a constrained kinematic fit to the $t\bar{t}$ hypothesis, making use of b -tagging to further reduce the combinatorial background.

- **Electroweak Production of Top Quarks in the Electron+Jets Channel at DØ**

Author: Shabnam Jabeen

Affiliation: University of Kansas

E-mail: jabeen@fnal.gov

Sorting Category: F6 (Heavy Quarks)

Abstract: Electroweak production of the top quark (single top) has yet to be observed. The single top cross section is sensitive to new physics and to the CKM matrix parameter

V_{tb} . The DØ experiment has collected so far more than 350 pb⁻¹ of data at $\sqrt{s} = 1.96$ TeV in $p\bar{p}$ collisions during Run II of the Fermilab Tevatron collider. Preliminary results of a search for single top quark production in the top decay channel $t \rightarrow Wb \rightarrow e\nu + \text{jets}$ are presented.

- **Search for Single Top Quark Production in the Electron+Jets Channel at DØ**

Author: Philip Perea

Affiliation: University of California, Riverside

E-mail: perea@fnal.gov

Sorting Category: F6 (Heavy Quarks)

Abstract: Protons and antiprotons are collided in Run II of the Fermilab Tevatron at a center of mass energy of 1.96 TeV. We present results of a search for single top quark production in these collisions using a dataset of approximately 230 pb⁻¹ collected with the DØ detector. This analysis considers the electron+jets final state and makes use of secondary-vertex tagging to identify jets originating from b quarks as well as neural networks to further separate the expected signals from backgrounds.

- **Search for Electroweak Production of the Top Quark in the Muon+Jets Channel at DØ**

Author: Daekwang Kau

Affiliation: Florida State University

E-mail: dkau@fnal.gov

Sorting Category: F6 (Heavy Quarks)

Abstract: Protons and antiprotons are collided in Run II of the Fermilab Tevatron at a center of mass energy of 1.96 TeV. We present results of a search for single top quark production in these collisions using a dataset of approximately 230 pb⁻¹ collected with the DØ detector. This analysis considers the muon+jets final state and makes use of secondary-vertex tagging to identify jets originating from b quarks as well as neural networks to further separate the expected signals from backgrounds.

- **Upper Limits on Cross Sections Using Kinematic Distributions and the Single Top Quark Search at DØ**

Author: Supriya Jain

Affiliation: University of Oklahoma

E-mail: sjain@fnal.gov

Sorting Category: F6 (Heavy Quarks)

Abstract: We discuss a statistical analysis method using kinematic distributions to compute the upper limits cross sections based on Bayesian statistics. This method uses a matrix that describes the global uncertainties and their correlations between signal acceptance and backgrounds, and also considers the uncertainties that change the shape of the distributions. As an example we discuss its application to the single top quark search at $\sqrt{s} = 1.96$ TeV in $p\bar{p}$ collisions using data collected by the DØ experiment during Run II of the Fermilab Tevatron collider.