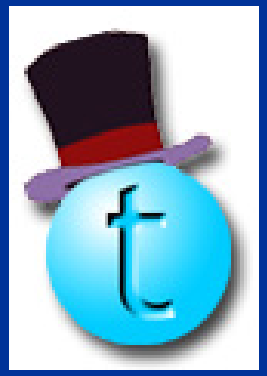
Top & EW Report

Timothy M.P. Tait

Argonne National Laboratory



TeV4LHC
10/22/2005

Outline

- Working Group Meeting
- Top Section
  - Single Top Production
    - Plan for the Report
  - The Top Mass Measurement
    - Plan for the Report
- Outlook

Working Group Meeting

- We've had a productive last few days, many presentations and a lot of discussion for the plan of attack for the final report.
  - Joint QCD Session
    - **Joey Huston**: CKKW News and Other Studies
    - **Rick Field**: New Tunes with Pythia and Jimmy
    - **Craig Group**: LHAPDF + LHAGLUE
    - **Dan Stump**: CTEQ α_s Series and the Road to CTEQ7
  - Single Top Session
    - **C-P Yuan**: Single Top Production at NLO
    - **Matt Bowen**: Exploiting Asymmetries in Single Top Searches
    - **Zack Sullivan**: Angular Correlations in Single Top Production
    - **Wolfgang Wagner**: Validation of Single Top MC Samples in CDF
    - **Florent Chevalier**: Single Top Production at the LHC
    - **Aran Garcia-Bellido**: Discussion of the Report Outline
  - Top Mass Measurement
    - **Doug Glenzinski**: Top Mass Now and Future Extrapolations

Report Section Outlines

- We have outlines for the things we would like to include in each section of the report.
- Names of volunteers have been attached to subsections.
  - If your name appears and you didn't volunteer: It means you have helpful friends who signed you up! Given the fact that we are obviously impressed with your expertise, we hope you will be able to contribute!
  - If your name doesn't appear and you want to volunteer: You are very welcome to contribute! Please let one of us know where you fit in!
  - If you have an idea for a new subsection: Please let us know! This outline is still evolving, and we expect it will take a few iterations for the draft to gel.
- We are planning "progress reports" about once a month to monitor our progress.
- A CVS repository to organize the TeX files will hopefully be set up soon.

Single Top Section

Sections 1, 2: Introduction, Theory

1. Introduction (W. Wagner, C. Ciobano, R. Schwienhorst,...)

- Brief description of what this entire section is about

2. Theoretical Studies

2.1 General theory overview (S. Willenbrock, T. Tait)

2.2 Single Top Quark production at NLO (S. Sullivan, Q.-H. Cao, C.-P. Yuan, F. Tramontano, ...)

2.3 Using Asymmetries in single top searches (M. Bowen, S. Ellis, M. Strassler)

2.4 Parton-level comparison of MC event generator to NLO (W. Wagner, C. Ciobano)

Section 3: Tevatron

3. Tevatron searches (Tevatron groups)

3.1 Physics goals

- specific goals at the Tevatron

3.2 Experimental signal signature

- final state topology

3.3 Backgrounds

- backgrounds by importance and how they are estimated

3.4 Description of the current D0 analysis (A. Garcia-Bellido, G. Watts, R. Schwienhorst, S. Jain)

3.5 Description of the current CDF analysis (W. Wagner, C. Ciobanu, B. Stelzer)

3.6 Prospects for discovery and future studies and their limitations, New physics (W. Wagner, C. Ciobanu, R. Schwienhorst, T. Tait)

3.7 Issues that need to be addressed

-by Theorists, questions that can be answered experimentally

-by Tevatron experiments themselves

Section 4: LHC

4. LHC searches (A. Lucotte, F. Chevallier, A. Giammanco, S. Slabospitsky)

4.1 Physics goals

- Goals, taking into account what the Tevatron will have measured

4.2 Description of the current analyses

-Signal signatures, backgrounds, analysis methods, MC results

4.3 Prospects for the various analysis channels,future studies and their limitations

4.4 New physics and help from the TeV

4.5 Issues that need to be addressed

-by theorists

-by Tevatron experiments

-by LHC experiments

Section 5: Connection

5. From the Tevatron to the LHC (A. Lucotte, F. Chevallier, A. Giammanco, S. Slabospitsky, R. Schwienhorst, G. Watts, A. Garcia-Bellido, ?)

5.1 Summary of commonalities between TeV and LHC

-Signal signature

-TeV SM single top is similar to LHC new physics searches in the top sector

5.2 Summary of differences between TeV and LHC

- low statistics search at TeV, requiring excellent signal-background separation

- high statistics precision physics at the LHC, requiring precise understanding of systematics

5.3 Summary of how existing TeV analyses and procedures apply to the LHC

5.4 Summary of studies needed for LHC that can be done at the TeV

The preliminary idea is to work out sections 1-4 and then synthesize section 5 from there.

Top Mass Section

Proposed Outline

I. Introduction

II. Theory Overview (T. Tait)

III. Top Mass Determination at the Tevatron (E. Barberis, F. Canelli, D. Glenzinski, M. Weber, U.-K. Yang)

- A. Methods
  1. Template
  2. Matrix Element (F. Fiedler)
  3. Kinematic
- B. Results
- C. Combination
  1. Method
  2. Limitations
  3. Outstanding Issues

Proposed Outline

III. Top Mass Determination at the Tevatron

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- D. Systematic Uncertainties
  1. Jet Energy Scale
     - a. Determination
     - b. Uncertainties
     - c. Limitations
  2. Signal Modeling
     - a. ISR/FSR
     - b. PDF
     - c. NLO
     - d. Q^2 scale
  3. Background Modeling
     - a. Normalization
     - b. Shape
  4. Miscellaneous

Proposed Outline

III. Top Mass Determination at the Tevatron

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E. Extrapolations

1. What we learned from Run 1
2. What we expect from Run 2

F. Using Mtop to look for New Physics

1. Comparison across channels
2. Differential distributions, dM/dX

IV. Top Mass Determination at the LHC (M. Mulders)

A. Methods

B. Systematic Uncertainties

C. Expectations

Proposed Outline

IV. Top Mass Determination at the LHC

…

D. Outstanding Issues

1. Issues for LHC to address
2. Issues for Tevatron to address
3. Issues for B-factories to address
4. Issues for HERA to address
5. Issues for Theorists to address

V. Conclusions

Outlook

- These outlines are a good starting point. The next step is to fill them in for January.
  - We welcome more collaborators, and new visions for material to include!
  - We still have topics without associated names…
  - Please contact one of us to express your desire to contribute.
- Some topics are clearly missing. For example, we have no mention of t tbar production, which is clearly on the menu for Tevatron and a major concern for the LHC.
  - Is anyone inspired?
  - Is there any other “broad topic” which we are missing?
- We will have a meeting in mid-November, and one in early December to see how things are going, decide on re-organization, etc.
  - Expect an announcement with details soon.
  - This is not planned to be a full-blown meeting, but instead at most a couple of hours of effort to see how things are going and how they fit together.
- Our goal for the first draft is **January 15, 2006.**