TOP SESSION

INTRODUCTION

Alberto Mengarelli
University of Bologna & INFN

Plans of Italian Groups for Run1/2

BOLOGNA

Run 1:

- Ttbar differential cross-section measurements in the lepton+jets channel at 8 TeV (resolved/boosted, at particle/parton-level)
- Performance studies on hadronic Top reconstruction in boosted regime using the Templsate Overlap Method (ongoing publication)

Run 2:

- Ttbar differential cross-section measurements in the lepton+jets channel at 13 TeV in the boosted regime .
- Ttbar resonance search by studying differential cross-section vs m_{Top}

Contacts: Matteo Negrini, Roberto Spighi

COSENZA

Run 1/2:

- Ttbar differential cross-section measurements in the lepton+jets channel at 8 TeV resolved
- Top mass studies

Contacts: Valerio Scarfone

UDINE

- **Search for SM 4-top production (l+jets):**
  -New analysis to start (SS dilepton final state already covered)
  -Final state reconstruction with the “Buckets” method
  -Multi-variate discriminant to distinguish SM 4t from tt+jets
  -New Physics signals will be considered, but focus / optimize for SM signal

Contacts: *R.Soualah*

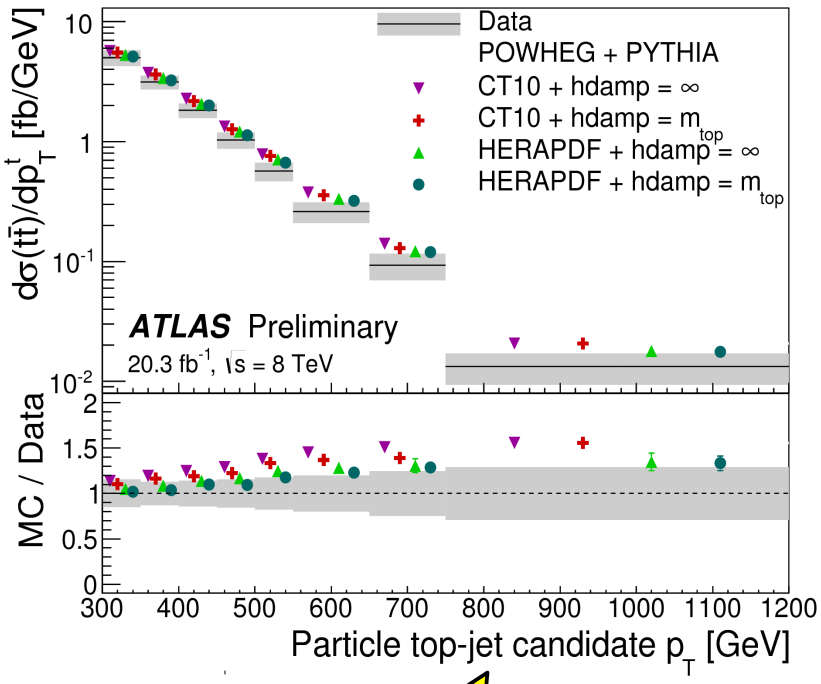
Upcoming Milestone

ATLAS-CONF-2014-057

"Measurement of the differential cross-section of highly boosted top quarks as a function of their transverse momentum using the ATLAS detector in √s = 8 TeV proton-proton collisions"

TOP2014: 7th International Workshop on Top Quark Physics

Cannes, France, 29 Sep - 3 Oct 2014



Paper ongoing status:

- Physical Review D proposed for publication.
- Aim to be ready for Top at Twenty (9-10 April 2015) conference at Fermilab

Previous Milestone

Published

"Measurements of top-quark pair differential cross-sections in the l+jets channel in pp collisions at √s = 7 TeV using the ATLAS detector"

Presented first at:

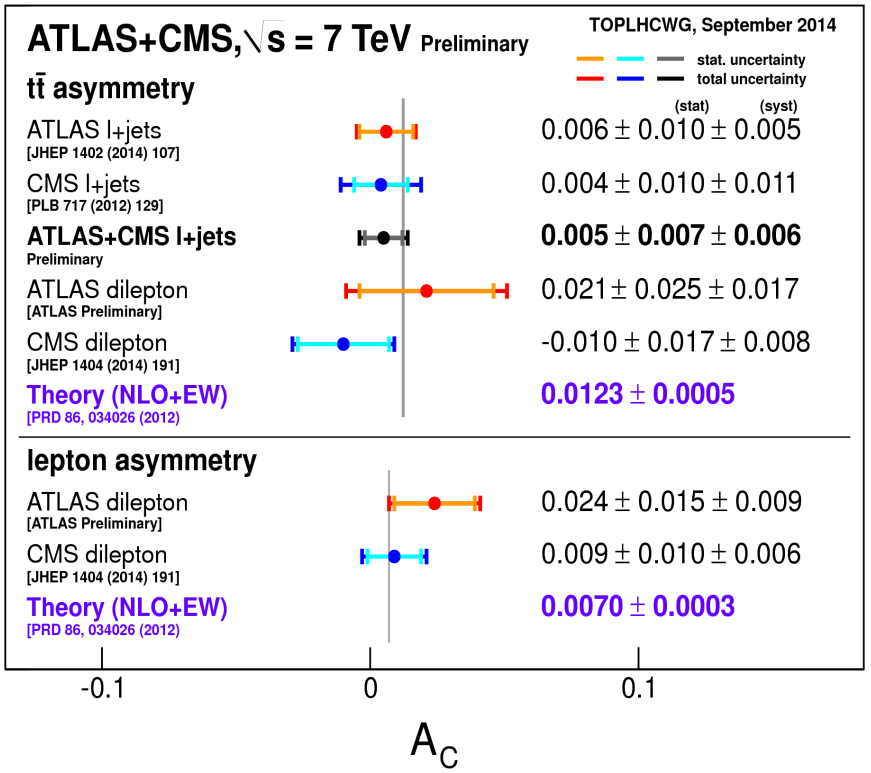
Top2013, *ATLAS-CONF-2013-099*

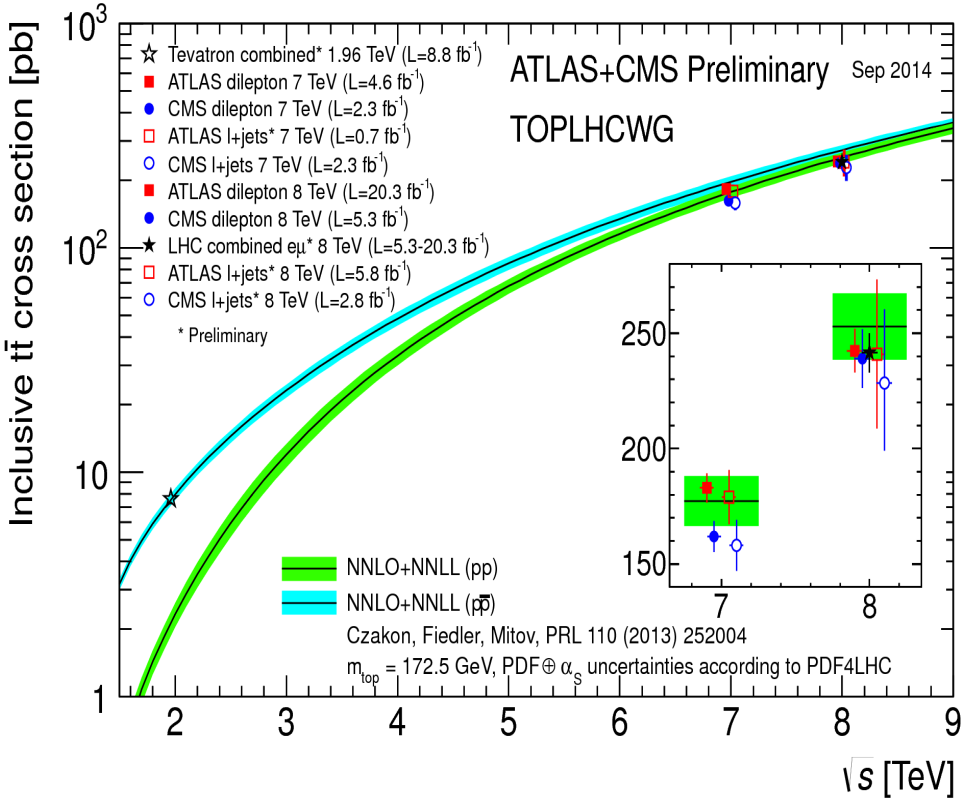
Submitted to *PRD*: 2014/07/01

Phys. Rev. D 90, 072004

Top RUN1 Summary Plots

- **RUN1 results have shown that precision top physics can be achieved at LHC**
- **Top measurements now widely used for calibration: jet energy scale and b-tagging efficiencies!**

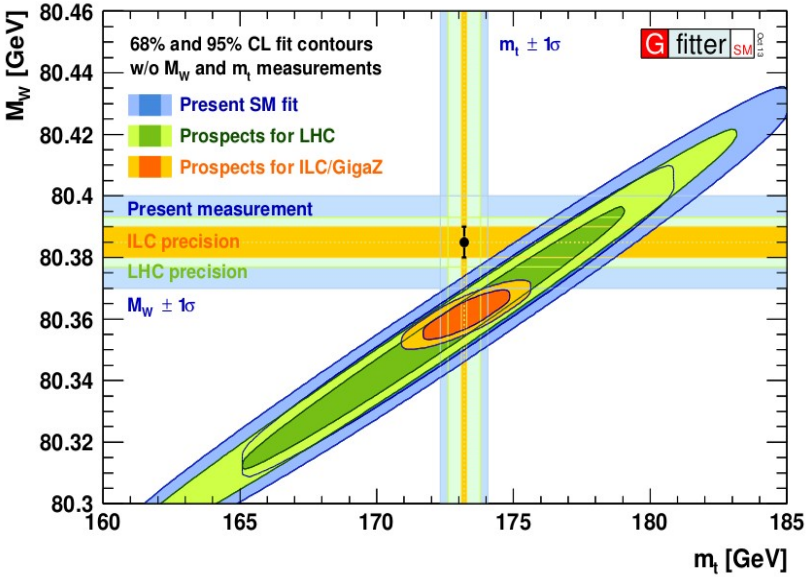




Top in RUN2, Why?

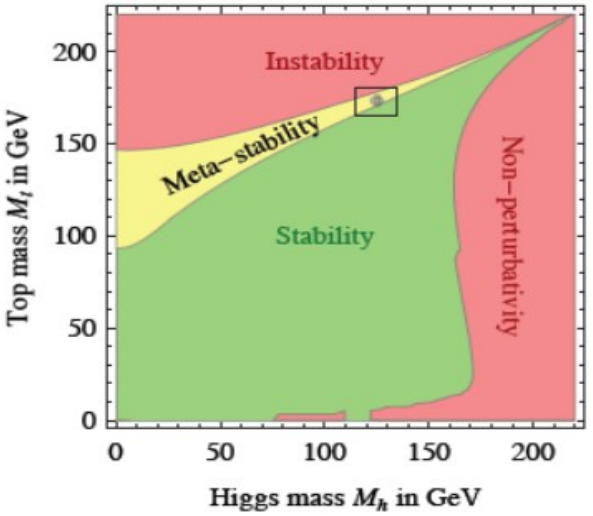
- **Standard Model precision tests**

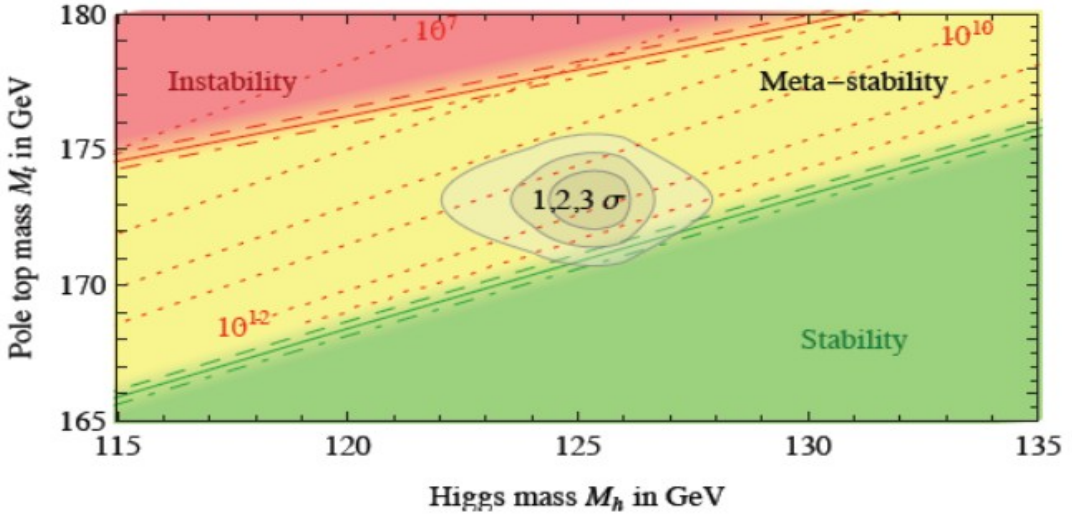
  - SM has no more degrees of freedom if M_W, m_T and M_h are known with precision



- **Top mass can tell us the fate of the Universe**

  -Vacuum stability very sensitive to M_h and m_T





Not only the Mass in the shopping list:

- Decay kinematics (diff. xsec)
- Rare decays
- Asymmetries
- Single top measurements
- Physics with/of (higly-)boosted tops
- .....

Talks in Agenda

1) *Ttbar and single Top production @ RUN2*

- **Valerio Scarfone** (phd student) INFN COSENZA

2) *Top properties study @ RUN2*

- **Marino Romano** (post-doc) INFN BOLOGNA

TheoryTalk

1) *Top and SM for Run2: A Theory perspective*

- **Alessandro Vicini** INFN MILANO