



DESY Top Physics Group Status

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LHC and us



From Top PAG (02.03.08) and TopDilepton WG (25.02.08) conveners:

- Luminosity planning scenario for CMS: 4 pb⁻¹ until end of June, but anything between 1 – 10 pb⁻¹ seems possible
- Roughly expected for 7 TeV (based on yields for 10 TeV from 2009 PAS Approvals):

Channel	Signal yields/pb ⁻¹ for sqrt(s) =	
	10 TeV	7 TeV
Dileptons (c.f. section 2.1)	6.0	2.7
μ+jets (c.f. section 2.2)	16	7.2
e+jets (c.f. section 2.3)	9.0	4.0

(ee+mumu+emu)

✓ https://twiki.cern.ch/twiki/pub/CMS/TWikiTopQuark/Top2010Strategy_v06.pdf

- Goal for 5 – 10 pb⁻¹: “re-discovery” and rough cross section measurement in dilepton, muon+jets, electron-jets channels

▪ **Plans for DESY in 2010:**

- “re-discovery” and rough cross section measurement in dilepton, muon+jets channels
- calibration of btagging algorithms



Top quark physics at DESY

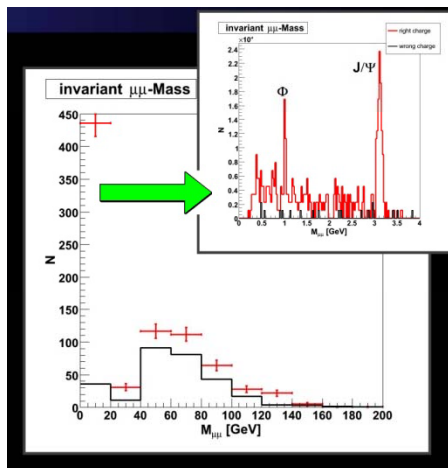


Hamburg: Top Dilepton Activities (see link to twiki in <http://cms.desy.de/e48952>)

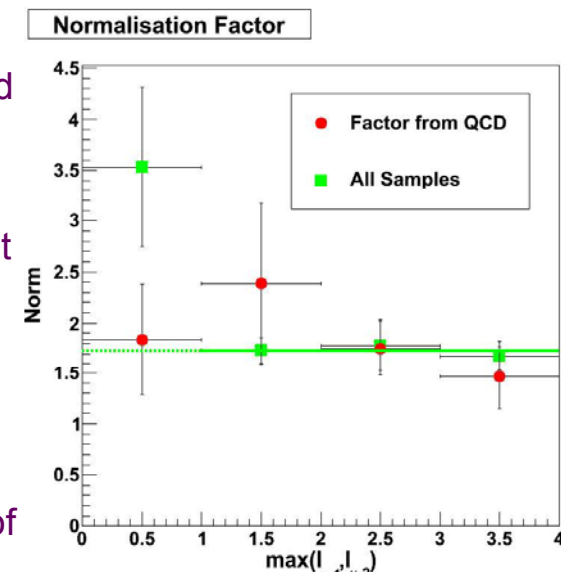
▪ **ttbar cross section determination in dimuon channel: Dirk Dammann**
(<http://indico.cern.ch/getFile.py/conferenceDisplay.py?confId=80425>)

- Event selection for 50 pb⁻¹ (7 TeV) : 2 isolated, high-pT , muons, ≥2 high- pT jets, mZ veto
- Focusing on data-driven methods for background estimation:
- “Wrong charge method” for QCD and fake muon bg → for large invariant masses, can be described by looking into the same-charge muon pair distribution

Same charge
Opposite charge



- ✓ Take the invariant dimuon mass after selection
- ✓ Count events with same- and opposite-charged muons in bins of the worst isolated muon's isolation ($\max(I_1, I_2)$)
- ✓ Signal, DY, gauge bosons contribute only in 1st bin
- ✓ Obtain the normalization factor between same charge and opposite charge evts in $N > 1$ bins and extrapolate into 1st bin
- ✓ Number of bg events = norm factor x number of same-charge muon events



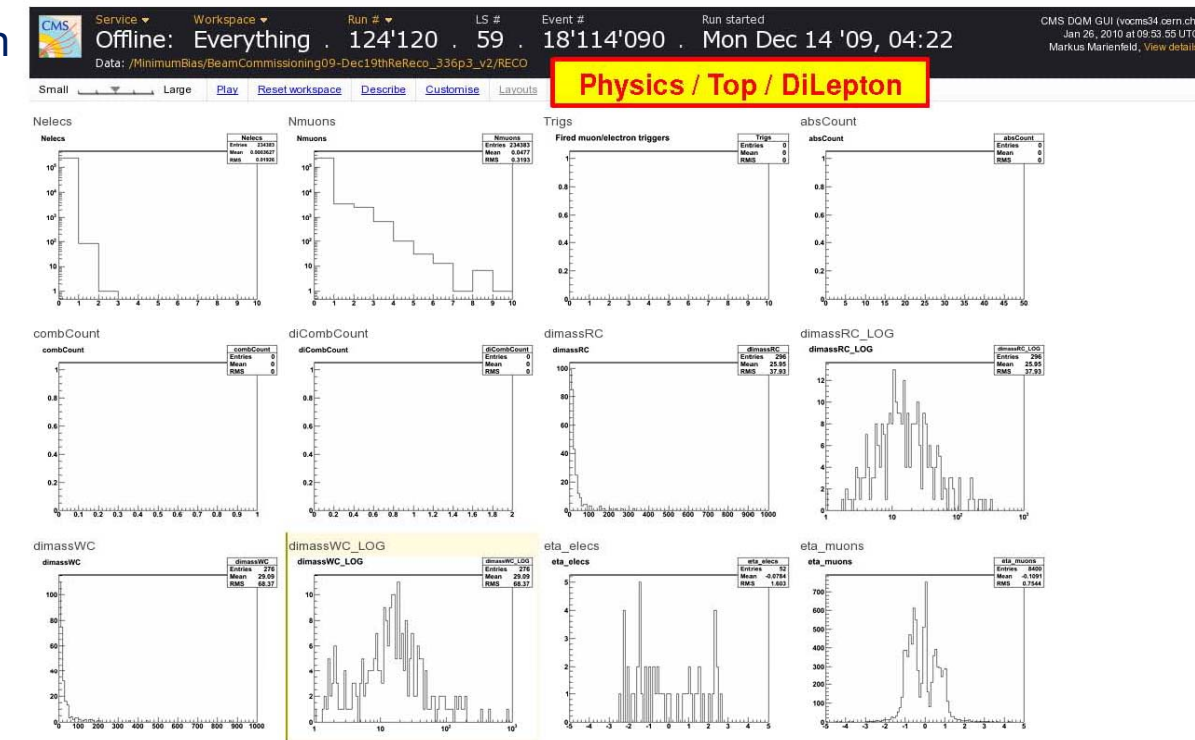
• Next steps: Drell-Yan bg estimation



Top quark physics at DESY



- **Online/Offline ttbar monitoring in the $\mu\mu/\mu e$ channel: M. Marienfeld**
(<http://indico.cern.ch/getFile.py/conferenceDisplay.py?confId=80425>)
- **Prompt data validation:** monitoring of dilepton reconstruction and efficiencies (RECO & HLT) for simple physics feedback (i.e, dilepton mass spectrum) → **Running within Offline DQM sequence since October 2009**
- **Plans for prompt trigger monitoring:** Online/offline monitoring and checks of lepton trigger efficiencies at HLT level ('tag&probe' approach) → **Tested**
- Top DQM Note in preparation



- Next steps: measure ttbar cross-section in dileptonic emu channel



Top quark physics at DESY



Zeuthen: Top mu+jets Activities (see link to twiki in <http://cms.desy.de/e48952>)

- **Analysis towards the measurement of $t\bar{t}$ cross section in the mu+jets channel and the calibration of btagging algorithms: Igor Marfin**
 - Event selection for $L = 100 \text{ pb}^{-1}$ and $\sqrt{s} = 10 \text{ TeV}$, slightly different from PAS 2009:
 - Top candidate is reconstructed as the combination of the 3 reco jets with maximal total p_T
 - Investigating the use of 2 methods for cross-section determination:
 - simple counting of the events surviving the selection cuts
 - fit to the S+B 3-jet invariant mass distribution to obtain the number of signal events
- First look into muon distributions from 900 / 2.36 GeV data