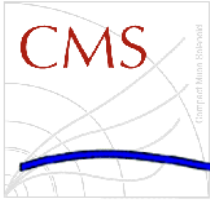


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Contributions of the TopGroup to the LHC-D Meeting

Roger Wolf



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Top Sessions at the LHC-D Meeting

- Two parallel sessions of overall ~6h (Convenors: Uwer, Christianziani, Schilling).
- 16 talks, 6 of these from cms

Mittwoch 16:00 bis 18:40

> =====

>

> ...

>

> **17:40 QCD radiation in ttbar events (Alexander Flossdorf, DESY, CMS, 15+5)**

>

> **18:00 Top for Calibration (Sebastian Naumann-Emme, Hamburg, CMS, 15+5)**

>

> ...

>

> Donnerstag 9:00 bis 12:30

> =====

>

> ...

>

> 9:40 BSM in ttbar / boosted top (Thomas Peiffer, KIT, CMS, 15+5)

>

> **10:00 Ttbar cross section at 10TeV (Jasmin Gruschke, KIT, CMS, 15+5)**

>

> 11:00 Single top in CMS (Jeannine Wagner, KIT, CMS, 15+5)

>

> 11:40 Ttbar spin correlations (Martina Davids, Aachen IIIb, CMS, 15+5)

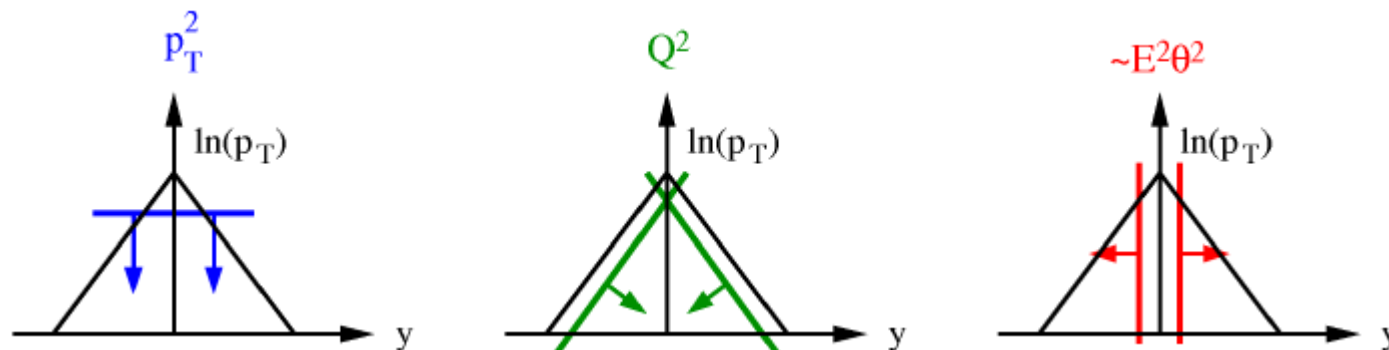
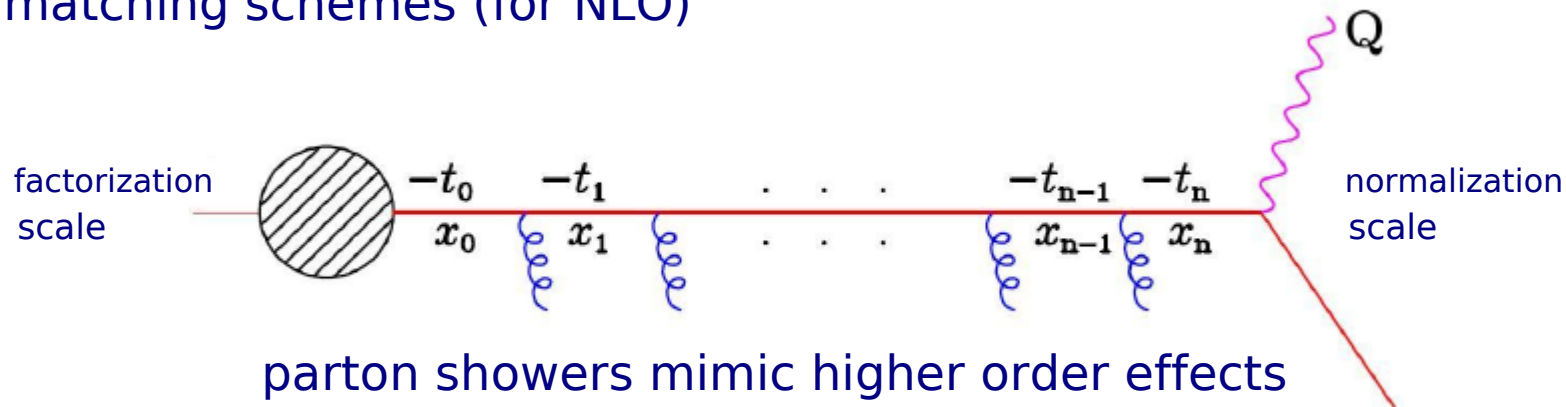
>

> 12:00 Discussion on Common Projects in LHC-D Top group (30)

QCD Radiation in $t\bar{t}b\bar{b}$ events

(Alex Flossdorf, DESY)

- Study of different QCD radiation models for $t\bar{t}b\bar{b}$ production:
 - **cutoff scale** (μ_{fac})
 - **evolution schemes**
 - matching schemes (for NLO)



three methods to populate the phase space

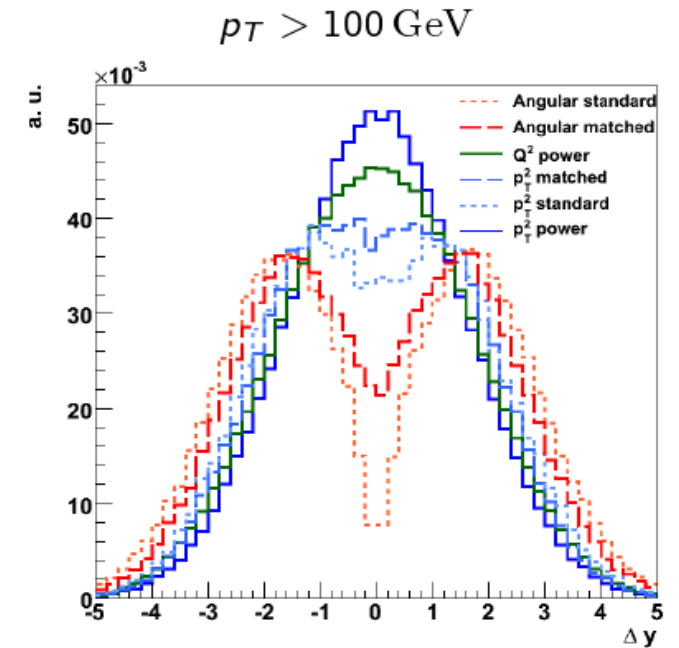
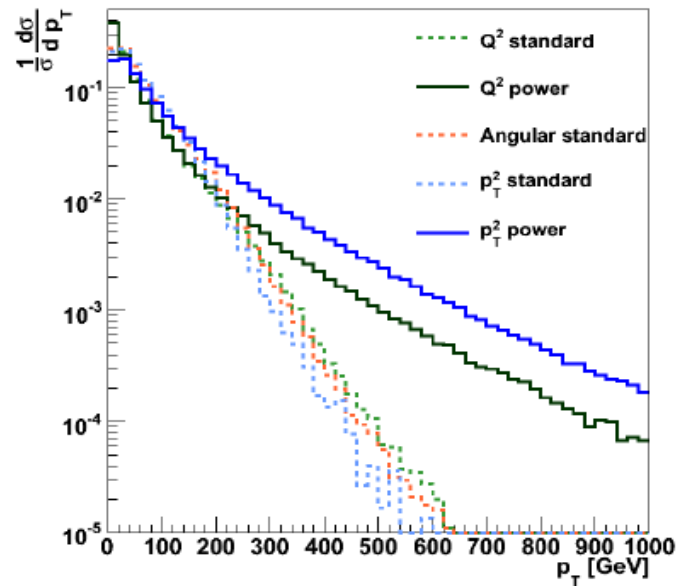
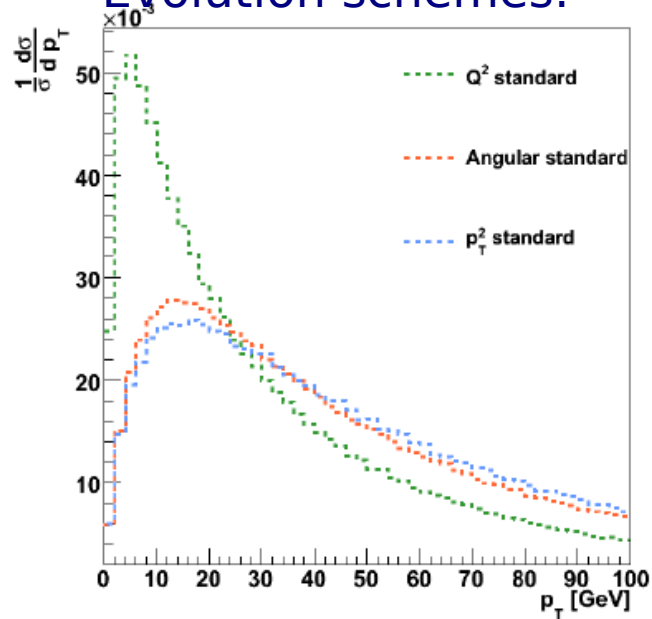
QCD Radiation in $t\bar{t}b\bar{b}$ events

Expect effects in $p_t(t\bar{t}b\bar{b})$:

$\Delta y(t\bar{t}b\bar{b}\text{-jet})$:

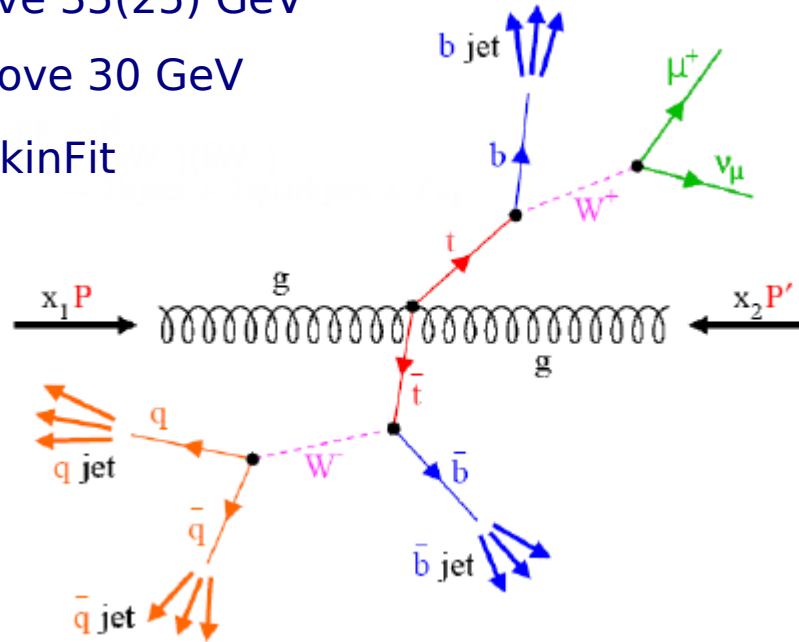
Evolution schemes:

Cutoff scale:

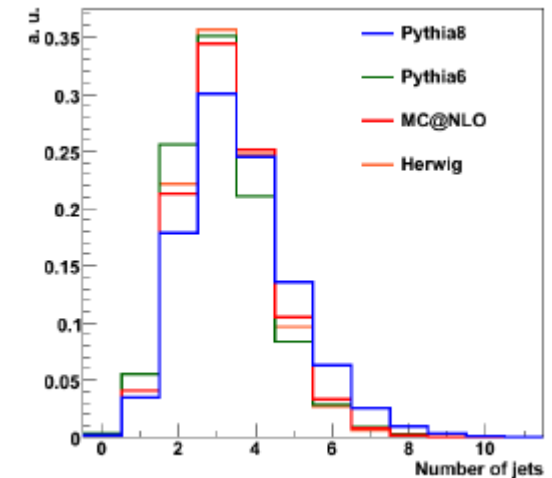


QCD Radiation in $t\bar{t}b\bar{b}$ events

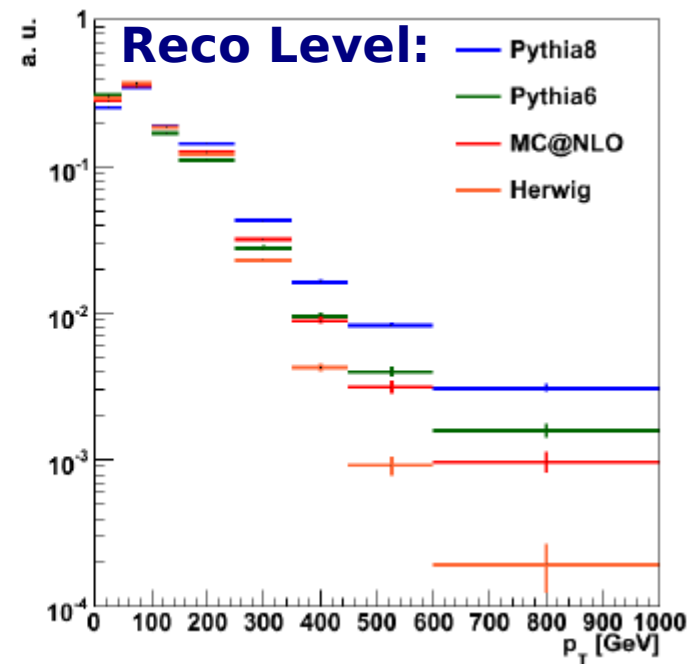
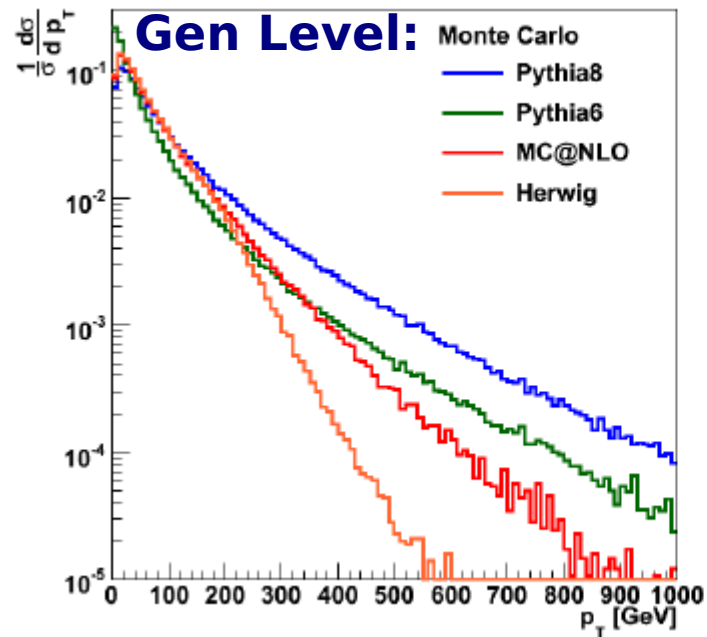
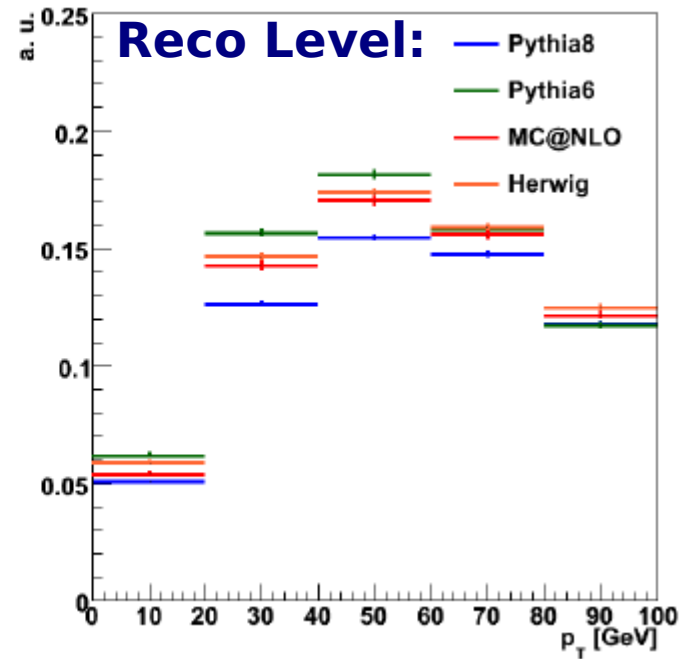
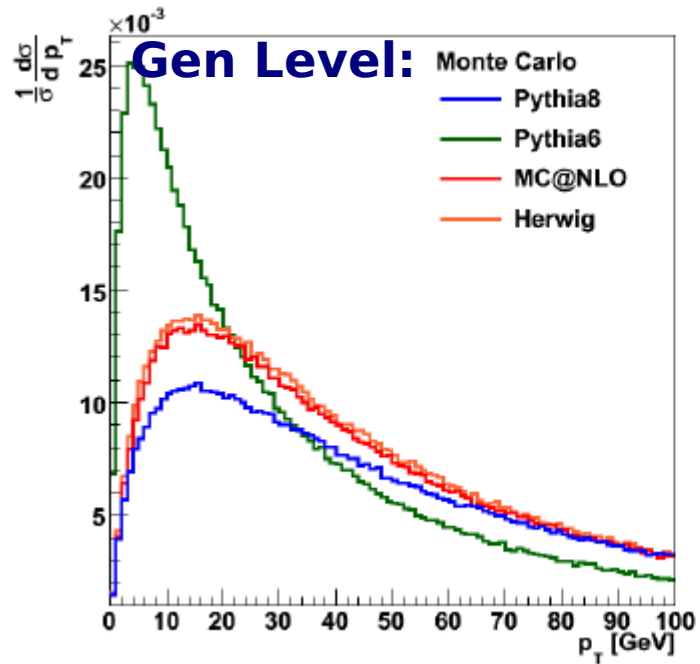
- Standard selection for $t\bar{t}b\bar{b}$ (semi-leptonic μ):
 - 3(4) jets above 35(25) GeV
 - Isolated μ above 30 GeV
 - Top reco via kinFit

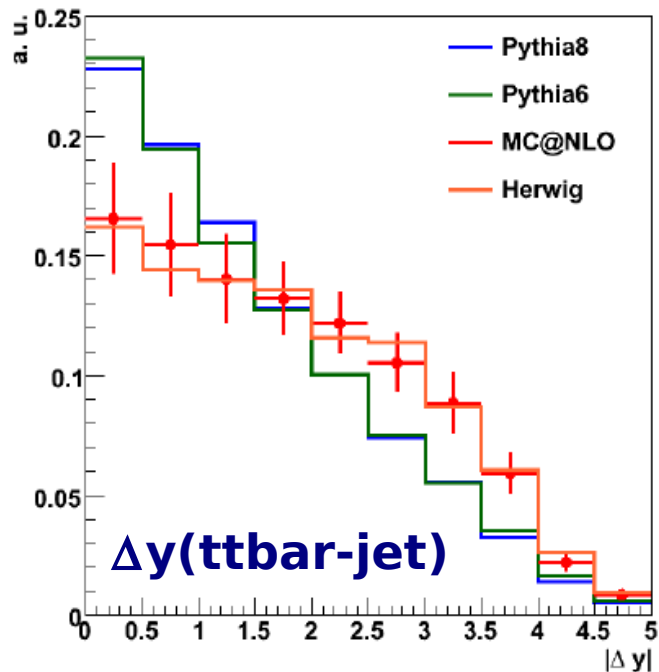
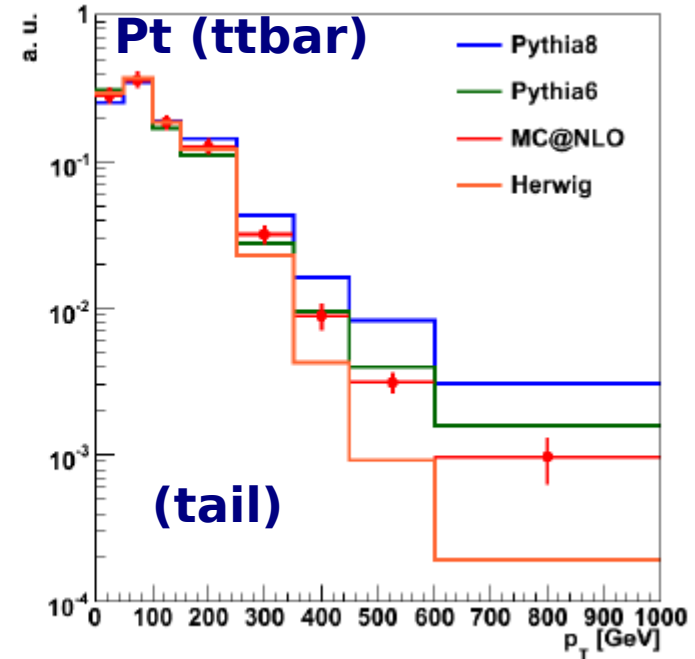
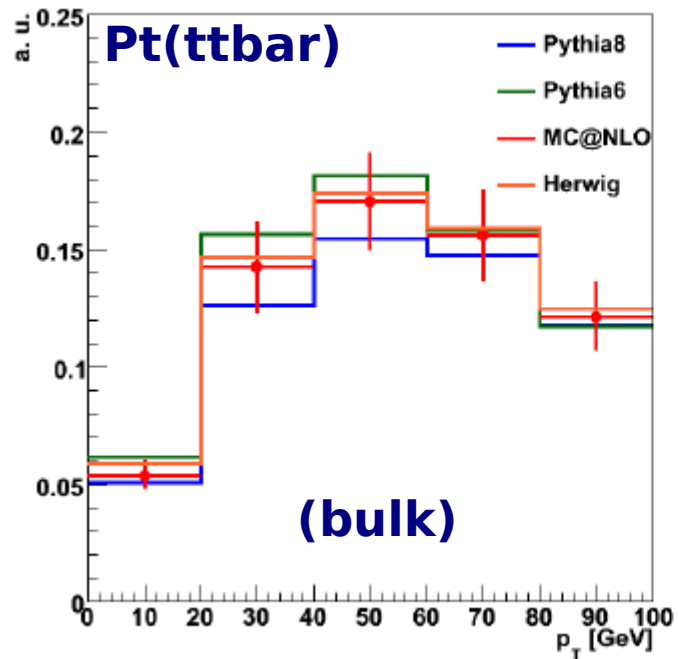


N(Jet) for different models:



Generator	Selected Events	Efficiency	S/B Ratio
HERWIG	57927	0.062	6.1
MC@NLO	57765	0.061	6.1
PYTHIA6	49256	0.052	5.2
PYTHIA8	61018	0.065	6.4





Different models compared on reco level
stat and sys errors shown with Herwig

stat: 7fb^{-1} (14 TeV)

sys: dominated by JES



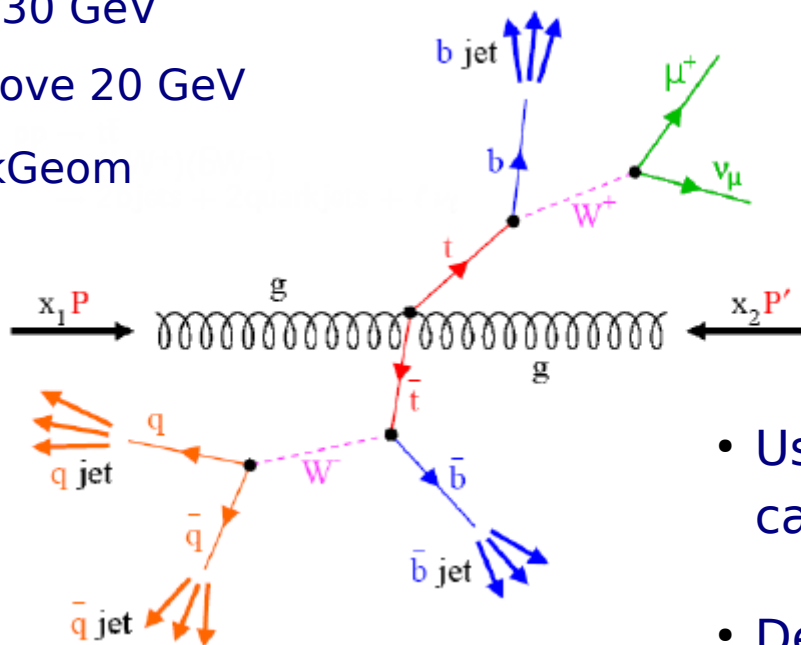
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Top for Calibration

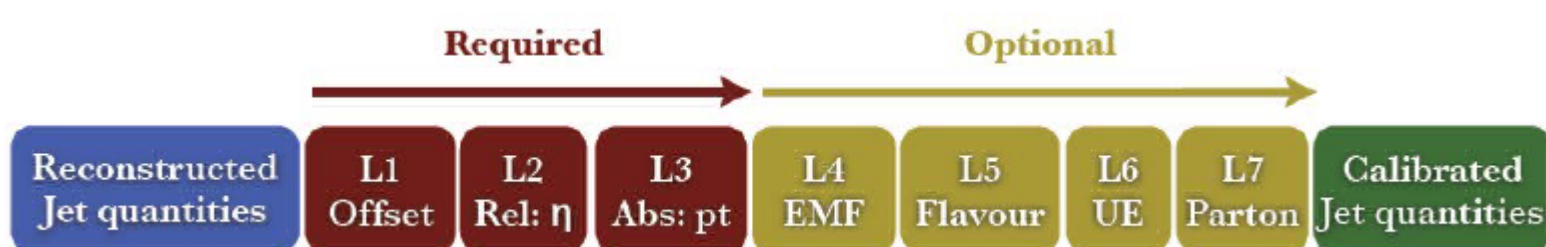
(Sebastian Naumann, UHH)

- Standard selection for $t\bar{t}b\bar{a}$ (semi-leptonic μ):

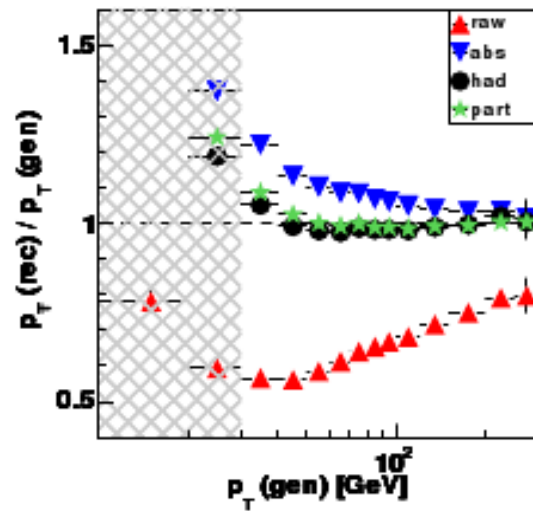
- 4 jets above 30 GeV
- Isolated μ above 20 GeV
- kGenMatch/kGeom



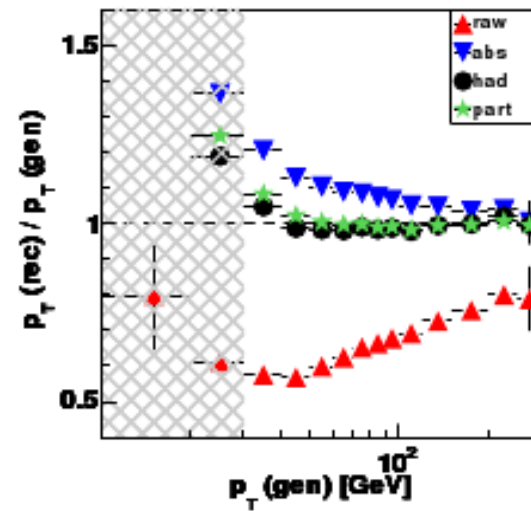
- Use top quarks validation of the CMS calibration model (factorized app.)
- Derive JEC factors with top quarks



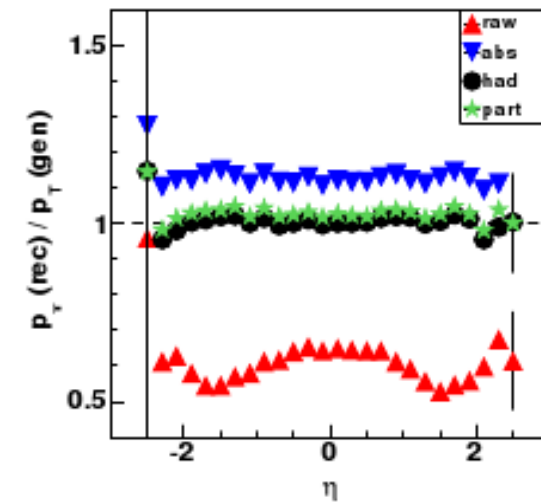
$$|\eta| < 2.4$$



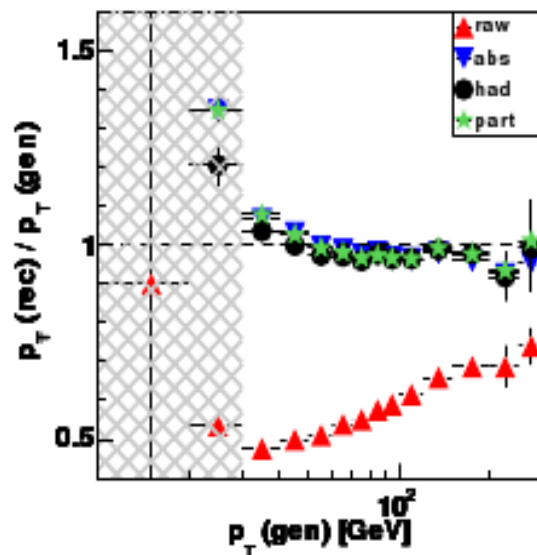
$$|\eta| < 1.3$$



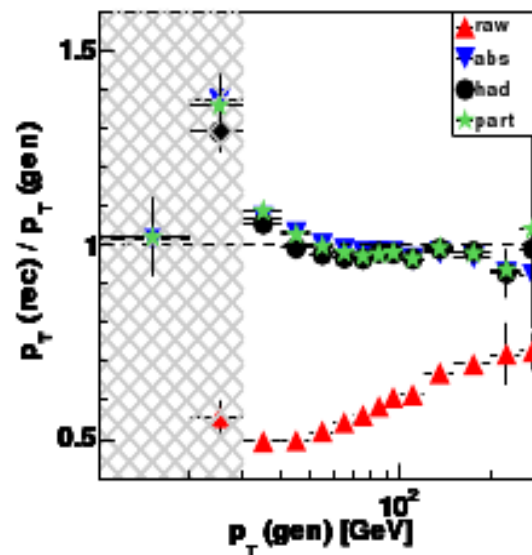
light quark-jets (from W)



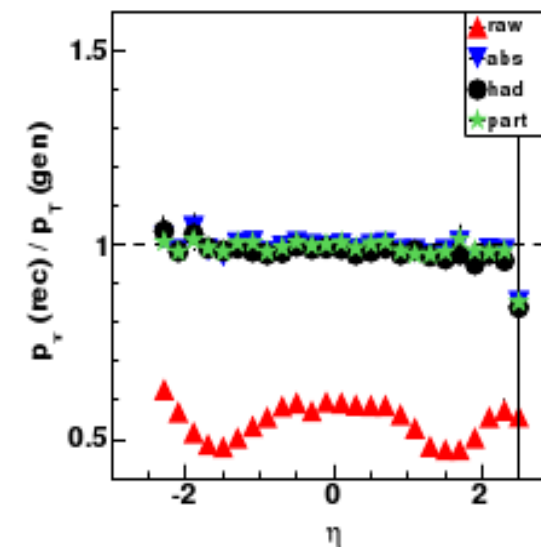
$$|\eta| < 2.4$$



$$|\eta| < 1.3$$

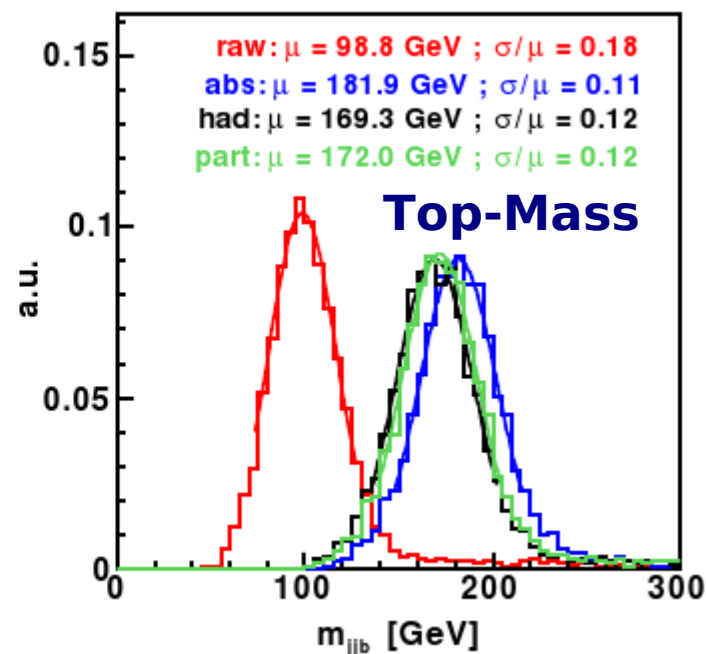
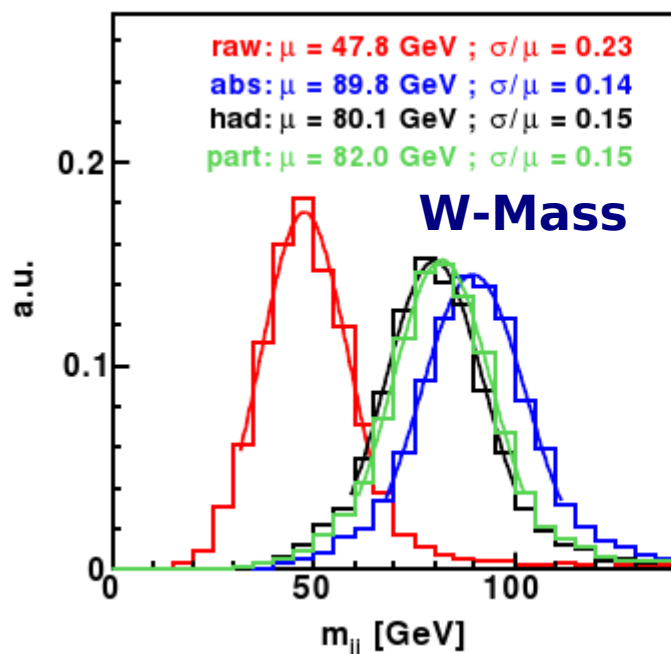


b quark-jets (from top)



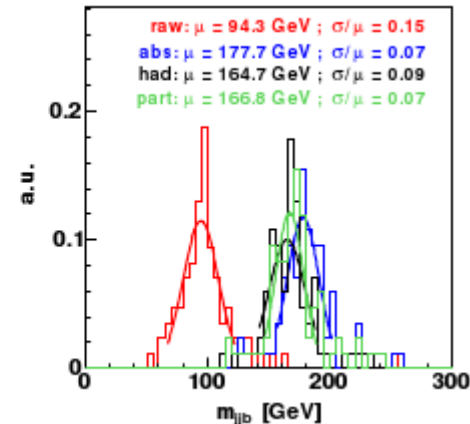
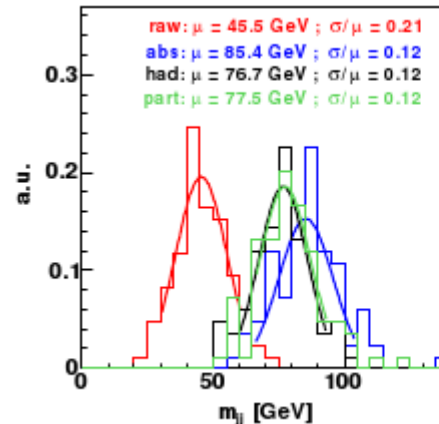
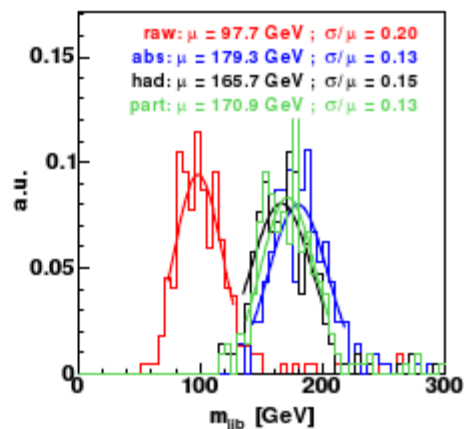
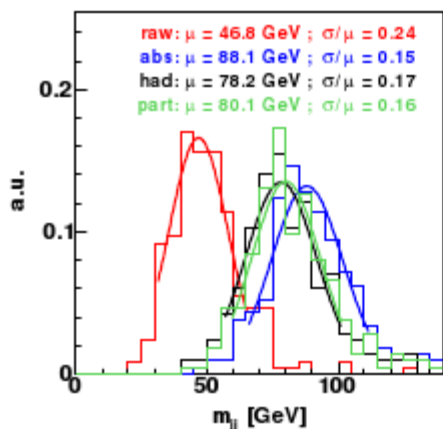
response: $p_T(\text{rec})/p_T(\text{gen})$ of jet 9

Full MC statistics



50pb⁻¹ (10 TeV)

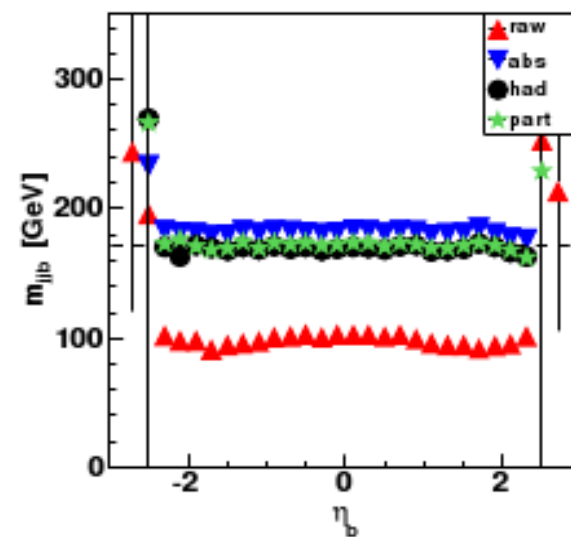
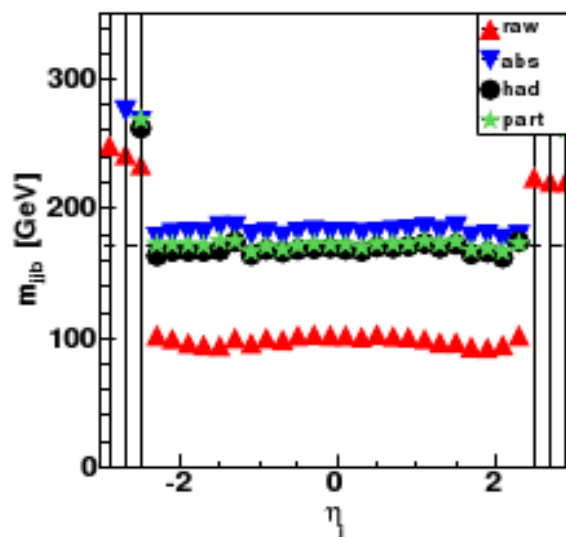
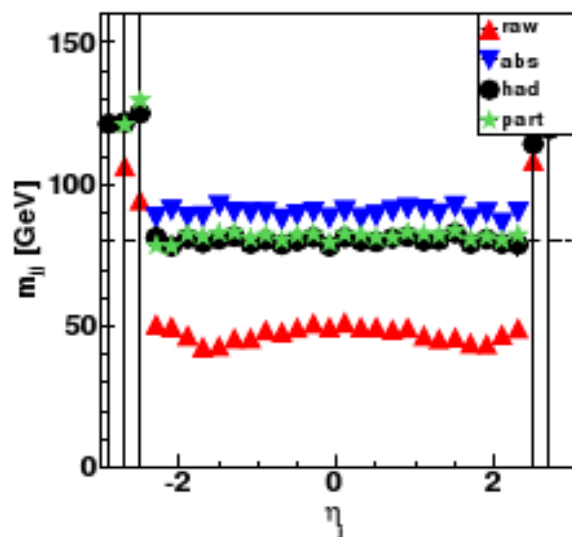
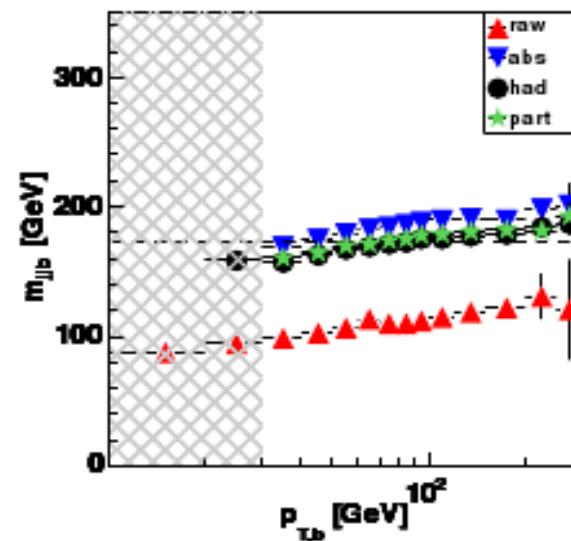
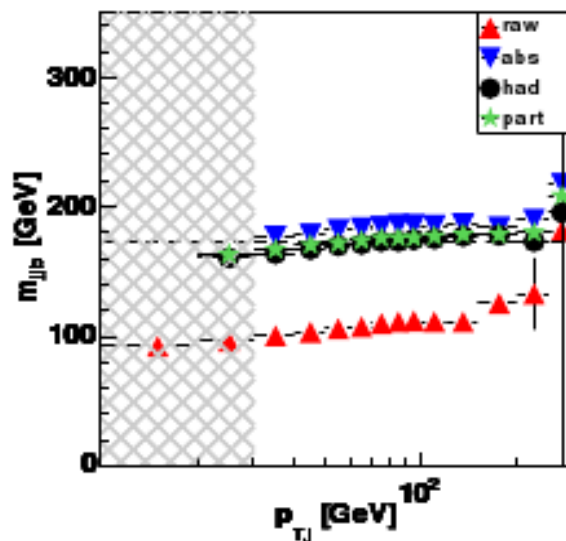
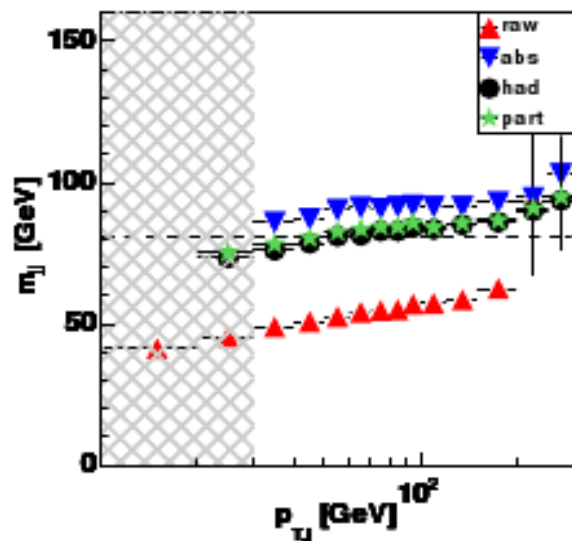
50pb⁻¹ (7 TeV)

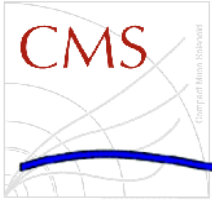




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m_{jj} shown differentially





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Ttbar Cross Section at 10 TeV

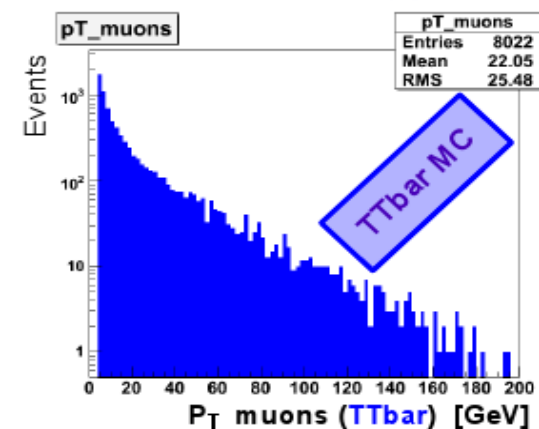
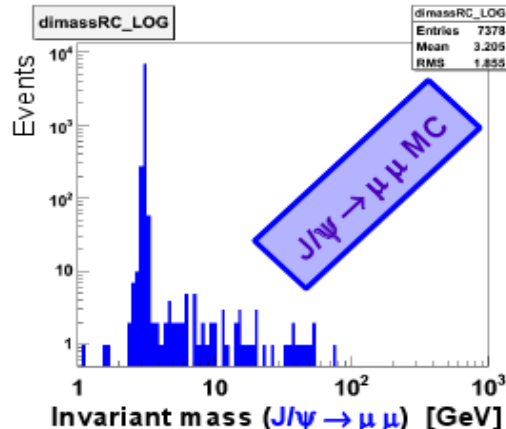
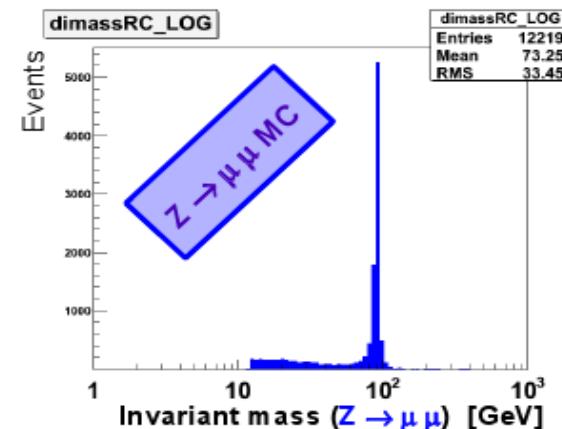
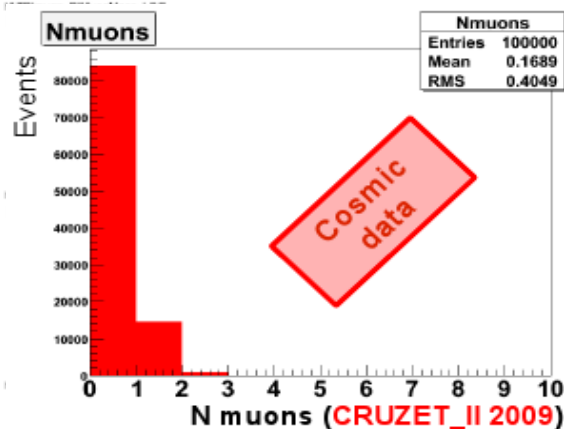
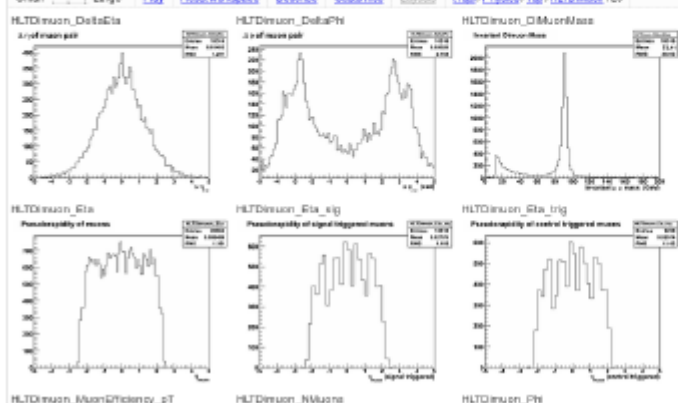
(Dirk Dammann, Markus Marienfeld, Holger Enderle, DESY/UHH)

- Here we'd like to contribute to a common presentation by Jasmin Gruschke representing all CMS Germany activities in this sector (15+5mins)
- Most this talk will be dedicated to official CMS-Analysis Notes
- Unlikely that HH will be represented by more than 3 slides here...



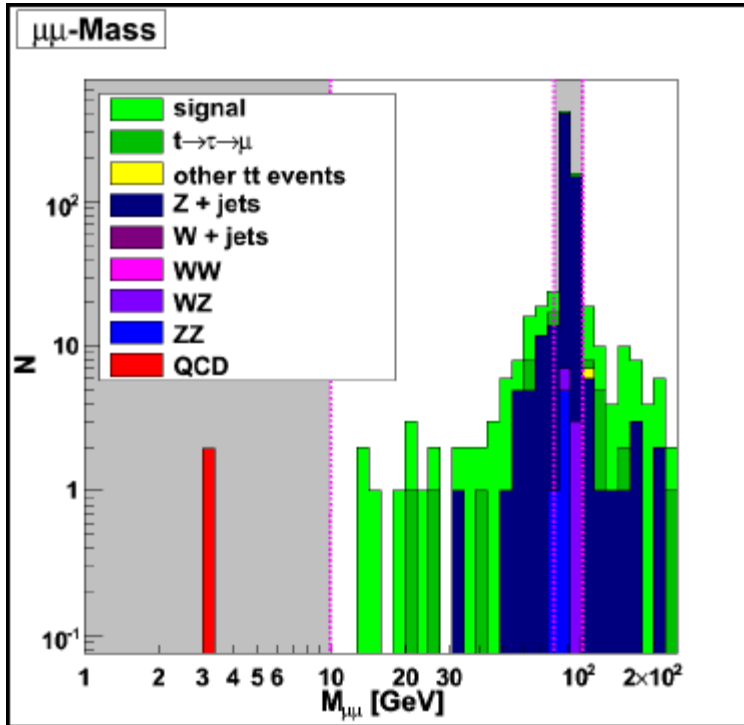
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Ttbar Cross Section at 10 TeV



- Potential contribution by Markus (showing our activities in the sector of early data validation)

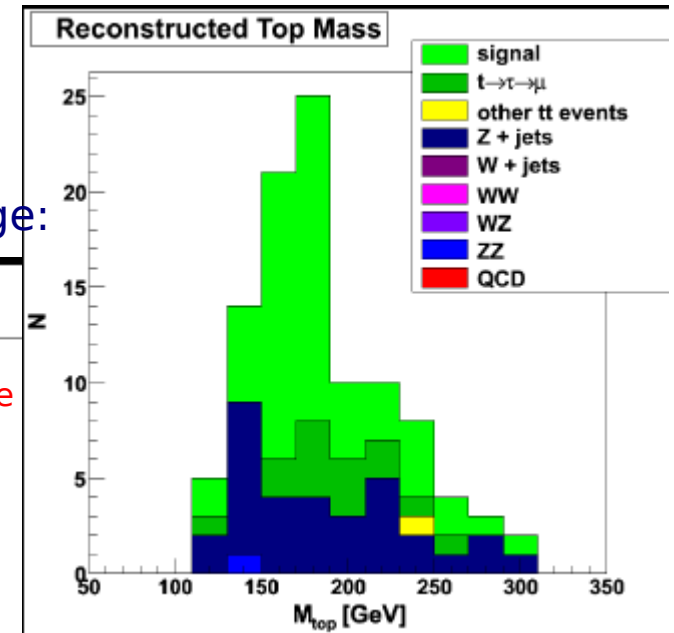
Inv. Mass $\mu\mu$ after presel.:



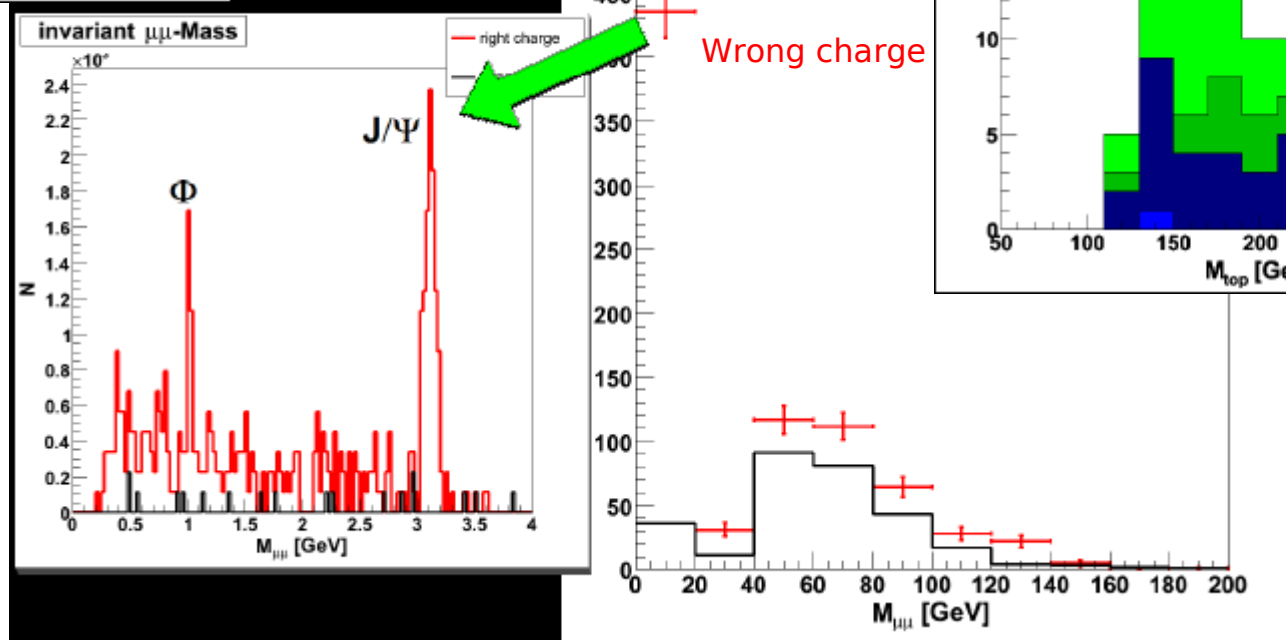
Cross Section measurement in the $\mu\mu$ -decay channel
With 100pb^{-1} (10 TeV) by Dirk:

- 2 isolated muons
- 2 b-tagged jets ($p_t > 40$ GeV)
- $S/B \sim 2$

Top-mass after full selection:

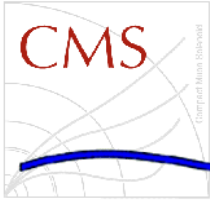


BG-Estimate using wrong charge:



Plans:

- Cross Section
- Mass Measurement
- B-Tag studies



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Conclusions

- Both CMS and Hamburg will be well represented at the LHC-D meeting.
- We will have to full talks of 15+5 mins by Alexander and Sebastian.
- Cross section measurements at CMS will only be represented by a single 15+5 mins talk given by Jasmin Gruschke from KA.
- We will also try to contribute here (but only if it make sense)
 - Nice results by Dirk
 - Could think of a contribution by Markus (to demonstrate our work on DQM)
 - Maybe a few plots by Holger (as recent results)