Distribution of People

Data Quality Montoring
- Coordination:
  -1PDoc @ CERN
- Offline: 1Phys,
  2 PDoc (-2) +1PhDs
- Remote Center:
  1 Phys + 1PDoc

Sum: 6

Calibration and Alignment
- SW & DPG Coordination:
  2PDoc (+1)
- Alignment,
  3Phys,
  2PDoc(-1+1), 1PhDs

Sum: 8

Computing & Software
- Committees 1 Phys
- Software inst.:
  2 Phys, 1PDoc (+1)
  0 PhDs (-1)

Sum: 4

- 23 staff (14FTE) , 22 Post-Docs (19 FTE), 12 PhD students, 3 undergrad. student, engineers, technicians
- fluctuations in # PostDocs increase: -1 & -3(May/june) +1 +?
- double –counting: some people work in two areas, some only part-time (Analysis Center, HERA, LC)
- YIG's still filling positions and attracting new DESY fellows

HLT & DAQ
- HLTS, ConfDB,
  1 Phys, 1PDoc -1PDoc

Sum: 2 (-1)
→ decision on keeping only maintenance

Technical Coordination
- Management:
  1Phys @ CERN
  (on leave from DESY)
- BeamConditionMonitor
  2 Phys, 2 PDoc,
  -1 PhDS
  @ DESY / CERN

Sum: 5

CASTOR Calorimeter
- Coordination: 1 Phys
- Fwd upgrade: +1Eng
- DAQ / Calibration / expert-oncall
  2 Phys, 2PDoc (-1)

Sum: 6

Tracker Upgrade
- Sensor aspects
  2Phys & 1 PhDS
- Integration Aspects
  1 Phys, 2 PDoc, 1 Eng

Pixel Upgrade
3 Phys, 3 PDoc

HCAL Upgrade(HO):
+2PDoc, +1PhDs

Sum: 16

Distribution of People II

QCD

- Fwd Physics Convener: 1 Phys @ CERN / DESY
- 2 Phys (+1(AnaCen)
- 3 PDoc (-1)
- 1 +1 PhDs (AnaCen)
- PDF: +1Phys

Sum: 9 (+1)

SUSY

- 1 Phys
- 4 PDoc (+2)
- 5 PhDs (+1)

Sum: 9 (+3)

Higgs

- 2 Phys (+1)
- 4 PDoc (+1)
- 2 PhDS (+1)

Sum: 8 (+3)

Top

- 1 Phys
- 2 PDoc
- 4 PhDs

Sum: 7 (-2)

(in summer : + 1 PDoc, +1 PhD)

PRC Remark → Strategic Meeting

Remarks

PRC Referee October 2010

- CMS detector working well. >90% data taking efficiency.
- DESY-CMS group is making vital contribution to the CMS experiment which is commensurate with the size of the group. (Travel budget sometimes a concern.)
- The upgrade projects appear to be progressing satisfactorily.
- Still relatively few visible physics output. Looking forward to many new exciting results in the coming months.
- Congratulations to the achievements so far!

Strategic Meeting

- One full day meeting with all leaders of the activities
- Define criteria for excellence
- Identifying goals for 6, 12, 24 months
- Identifying synergies between activities within the group & DESY
  - For example tracking: analysis center developed new Milipede II → use this for CMS tracking → use on the NAF (with upgraded computing resources).
- Layout strategy for excellent and visible output in physics and operation
- Discussion of general items:
  - like structure of the group, responsibilities, communication, measures to attract new PhD studends, Post Docs …

Present Group Structure

Groupleader - K. Borras Deputy - G. Eckerlin

Physics - A. Meyer

Top	Higgs	SUSY	QCD	PDF
M. Aldaya A. Geiser	A. Raspereza	I. Melzer-Pellmann	T. Schörner K. Borras H. Jung	K. Lipka

Components and Operation

DQM	Tracker	Alignment	CASTOR HLT/DAQ	BCM	Computing
A. Meyer	G. Eckerlin	R. Mankel	K. Borras	W. Lohmann	M. Kasemann

Upgrade - G. Eckerlin

Pixel	Tracker	HCAL/μTCA	BCM
D. Pitzl G. Eckerlin	G. Eckerlin W. Lohmann	K. Borras I. Melzer-Pellmann	W. Lohmann A. Raspereza

Physics Topics

- QCD / Forward Physics
  - Multiparton Interactions / UE
  - QCD at small x
  - Forward energy flow
  - Hard forward / central jets
- HERAPDF
- Higgs
  - MSSM Higgs Searches
    - H(A)→ττ→μμ (advanced)
    - bbH(A)→bbbb (starting)
  - Drell/Yan cross sections (with EWK)
  - B-tagging studies using ttbar events
  - Charm reconstruction (with BPH)
- Susy
  - Two lepton analysis with μ and e (same sign and opposite sign)
  - Characterization effort: Prepare analysis of data w.r.t simplified models
- Top Quarks
  - Cross section measurement in the di-lepton channels
  - Top quark mass determination
  - bbZ production (with EWK)
- B-tagging with upgrade pixel detector

Commonalities

- QCD / Forward Physics
  - Multiparton Interactions / UE
  - QCD at small x
  - Forward energy flow
  - Hard forward / central jets
- HERAPDF
- Higgs
  - MSSM Higgs Searches
    - H(A)→ττ→μμ (advanced)
    - bbH(A)→bbbb (starting)
  - Drell/Yan cross sections (with EWK)
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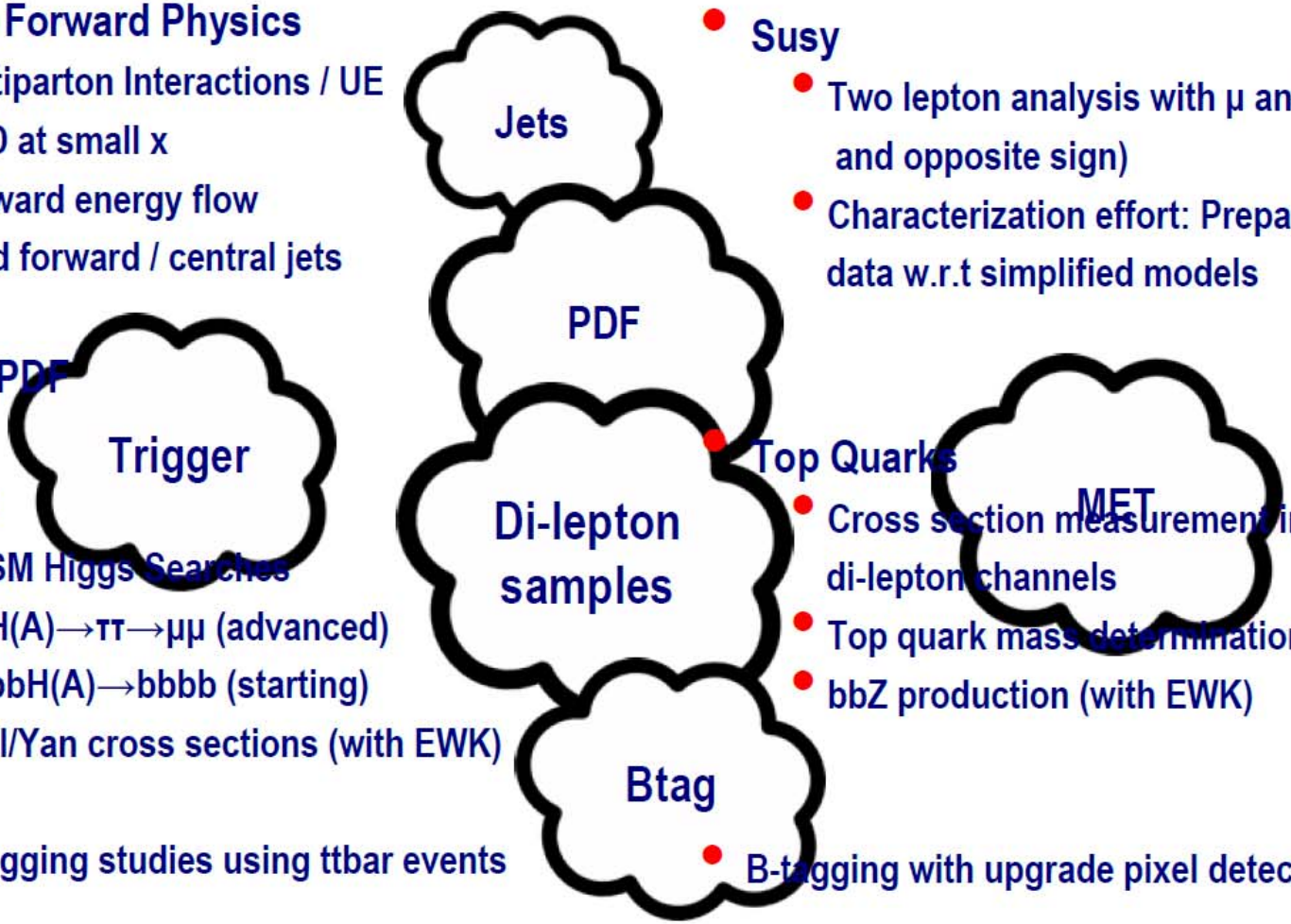
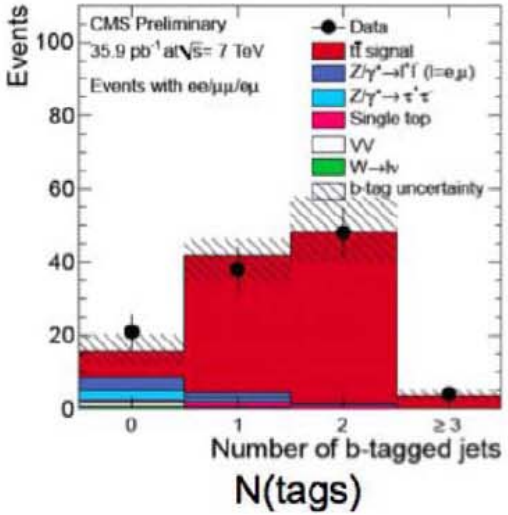


- Susy
  - Two lepton analysis with μ and e (same sign and opposite sign)
  - Characterization effort: Prepare analysis of data w.r.t simplified models
- Top Quarks
  - Cross section measurement in the di-lepton channels
  - Top quark mass determination
  - bbZ production (with EWK)
- B-tagging with upgrade pixel detector

Top Quarks (di-lepton channel)

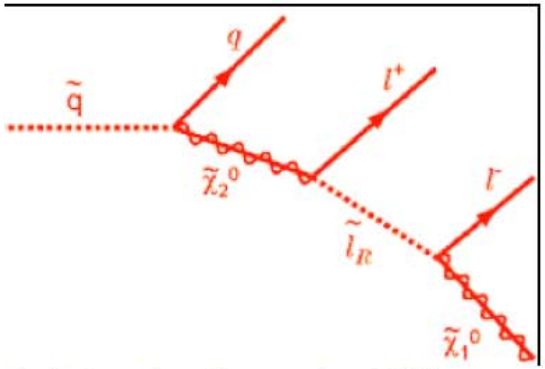
- **2010 achievements:**
  - ttbar cross section measurement in dimuon channel (PAS : TOP-10-005 – paper in preparation)
    - cross check analysis for cross section measurement
    - QCD background determination using wrong-sign sample
    - kinematic reconstruction of top mass
    - reference result for cross section ratio: $\sigma(pp \rightarrow tt)/\sigma(pp \rightarrow Z+X)$
  - Study of Zbb production within EWK group (work in progress)
  - emu and ee channels in preparation (reproduced public results)



- **2011 plans:**
  - differential cross section measurement using all 3 channels
  - determination of top quark mass from cross section measurement

- **People :**
  - Presently: 1 Senior (part time), 2 PostDocs (part time), 2 Students (2 other students finishing now)
  - Timescale summer: 1 new PostDoc and 1 new student starting

Susy (di-lepton channels)



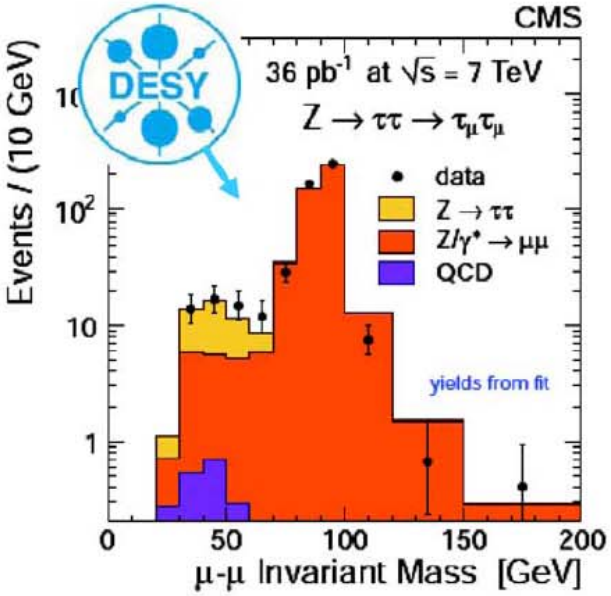
- 2010 achievements:
  - Using same sign and opposite sign samples
  - Same sign (RA5): alternative method for ttbar background determination using bbbar samples
  - Opposite sign (RA6): novel signal/background determination using di-lepton mass kinematics
  - Preparing interpretation of data using simplified models (OSET), implementation of relevant software in CMS

- 2011 plans:
  - Same sign: cross check analysis and specific background determination for summer 2011
  - Opposite sign: genuine DESY result with 1 fb^{-1} or more (likely somewhat after summer 2011)
  - Extension of di-lepton analysis using b-tags (DESY + possibly other groups)
    - motivated by light gluino decaying into 3rd generation particles
    - plan: results for 2011 summer conferences

- People :
  - 1 Senior, 4 PostDocs (2 starting), 4 Students (+ 1 finishing)

Higgs (MSSM)

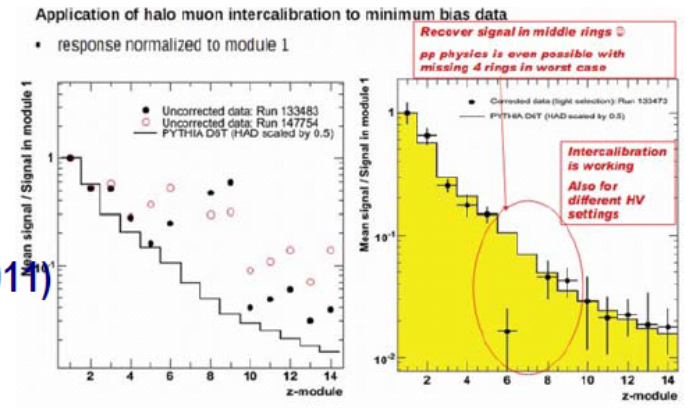
- **2010 achievements** **Publication:** arXiv:submit/**0227764** [hep-ex]
  - Z-> tautau cross section analysis in mumu channel (novel analysis technique) published
  - H->tautau->mumu + MET prepared and ready for approval (next round of CMS approvals)
  - bbH->bbbb search started
    - trigger development just finished
    - b-tagging preparing calibration of tagging algorithms using
      - ttbar samples
      - D-mesons (work in progess for B-physics result)



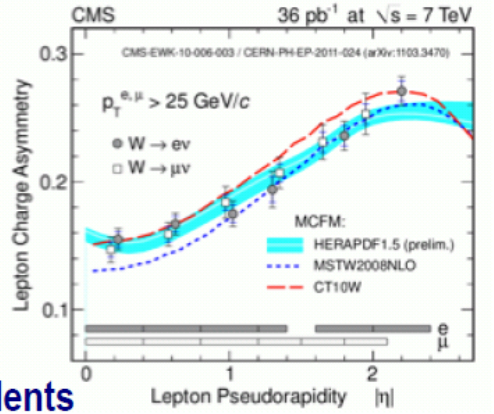
- **2011 plans:**
  - H->tautau->mumu + MET with full stats. for summer
  - Optimize separation of H signal from Z backgrounds
  - bbH->bbbb exploratory analysis
  - produce charm meson cross sections (inclusive and w.r.t. hard jet events)

- **People :**
  - 2 seniors (1 part time), 4 PostDocs (1 joining), 2 Students
  - Expect 1 or 2 more students at time scale summer

QCD (FWD and PDF)



- **2010 Achievements:**
  - Measurement of forward energy flow (HF) published (FWD-10-011)
  - CASTOR calibration (of mesh-type PMT)
  - HI & pp centrality correlations
  - PDF: HERAPDF for predictions of several CMS results (e.g. ttbar, W asymmetry, fwd jets)
- **2011 plans:**
  - Measurement of forward energy flow using CASTOR
  - MC tuning using low-pt min bias data (with Analysis Center)
  - Preparing analysis with CASTOR and central + fwd jet measurements (small x evolutions)
  - Cosmic Ray calibration (with Karlsruhe)
  - Overcome pile-up to continue analyses at high lumi
  - PDF: Establish HERAPDF as one of the main PDF in use at CMS



- **People : ok**
  - 4 Seniors (1 PAG convenor, 2 part time, 1 PDF), 3 PostDocs, 2 students
  - Additional help coming from Armenia (JINR funded)

CMS Pixel Upgrade

- TP finalizing (following the LHCC recommendation)
  - Preliminary cost and schedule
  - Basis for physics case
  - Will be used for funding requests

- First preliminary finance matrix shown in RRB
  - Including DESY contribution for BPIX layer 4

- TDR for pixel upgrade by end of this year
  - Regular meetings of the “Phase 1 Upgrade Management Board”
  - Timeline, Resources, Responsibilities

- First D-Consortium meeting in May during CMS upgrade week
  - Review status
  - Timelines and responsibilities

- Goal : decouple Pixel upgrade from LHC schedule (LS2)
  - be ready by mid 2016 and use next extended technical stop

DESY Activities for BPIX

• Produce assembly tools	since 2010
• Develop assembly procedures	2011
• Develop testing and calibration procedures	2011
• Bump bonding tests	2010-2011
• Decide on bump bonding technique	end 2011
• Assembly and test procedures established	2012
• Receive all components for series production	2013
• Module assembly and calibration	2013-2015
• 4th layer assembly and test	mid 2015
• Full system test at CERN	2015-2016
• Ready for installation in CMS	mid 2016

Backup

Castor Physics Program

Forward physics

proton-proton

- MPI and underlying event structure

→ energy flow measurement for MC tuning

- Low-x QCD physics

→ forward jets

→ central+forward jets correlation

- Diffraction

→ rapidity gap tagging (veto)

heavy ions (Pb-Pb) & cosmic-ray

- Quark-Gluon plasma physics

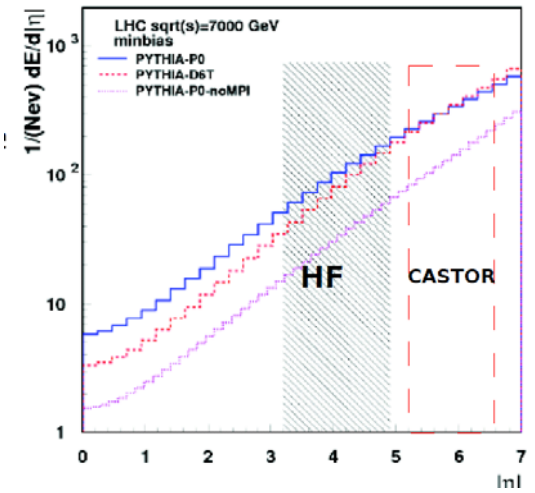
→ limiting fragmentation regime (CGC)

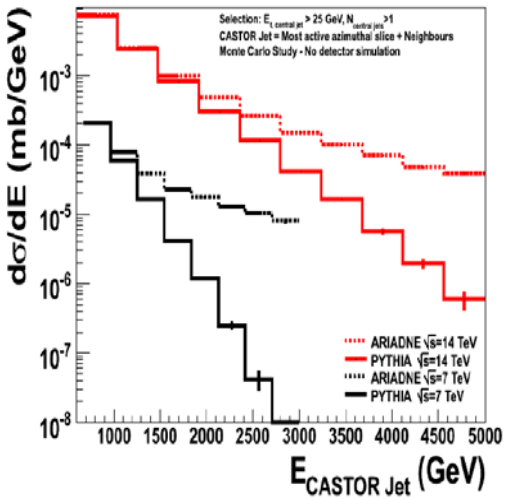
→ large net baryon density region

→ event centrality

→ exotics (Centauro-type events)

- Extensive Air Showers, MC tuning





ARCs and committees

- ARC chair:
  - BPH-10-011 (A.Meyer)
- ARC member: (K.Borras)
  - FWD-10-002
  - FWD-10-003 (fwd jets),
  - FWD-10-008 (diffr. W u Z)
  - FWD-10-011
- Editors:
  - BPH-10-018 (A.Meyer)
  - tracking paper 2011 (R.Mankel)

Activities / Communications / Contributions

- Physics Analysis Goals
  - within each topic perform one 'reference' analysis
  - contribute to one or more cross check analyses
  - perform one exploratory/feasibility study

- Strategic Physics Analysis Goals
  - Data samples shared across groups
  - Software shared across groups
  - Cooperation with Analysis Center
  - Use expertise from alignment
  - Link DQM / PVT with data certification / physics
  - Exploit computing infrastructure at DESY(Tier-2 / NAF / CAF / local)
  - Collaborate with DESY theory / fitting / uni groups
  - Establish HERAPDF as a one of the main PDF used in CMS
  - Presence and visibility at CERN

- Physics communications
  - Physics planning meetings, ~monthly
  - Physics analysis group meetings with Uni-HH, weekly
  - Wednesday CMS-internal 'seminars' with Uni-HH, every 2 weeks
  - DESY-wide LHC Discussions with ATLAS & Theory, monthly
  - Cooperation with Universities KIT, Aachen, every 1-2 weeks
  - Webpages and Documentation

- Other physics contributions
  - Group comments to papers 9 paper drafts, including 3 inst. reviews
  - Talks at conferences
    - General conferences: ?
    - German physics society 2011: 10 talks
  - Committees (1), ARC member (4), ARC chair (1), paper editor (2)
  - PAG Convenor (1, FWD physics)