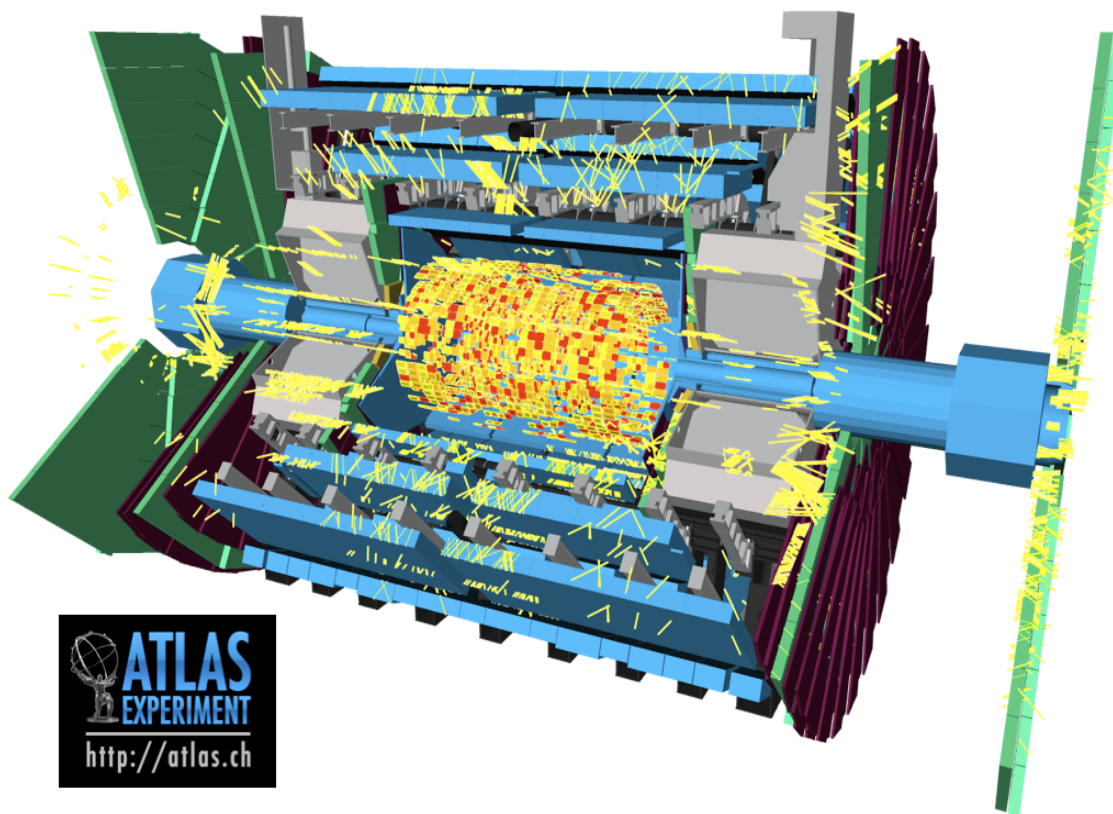


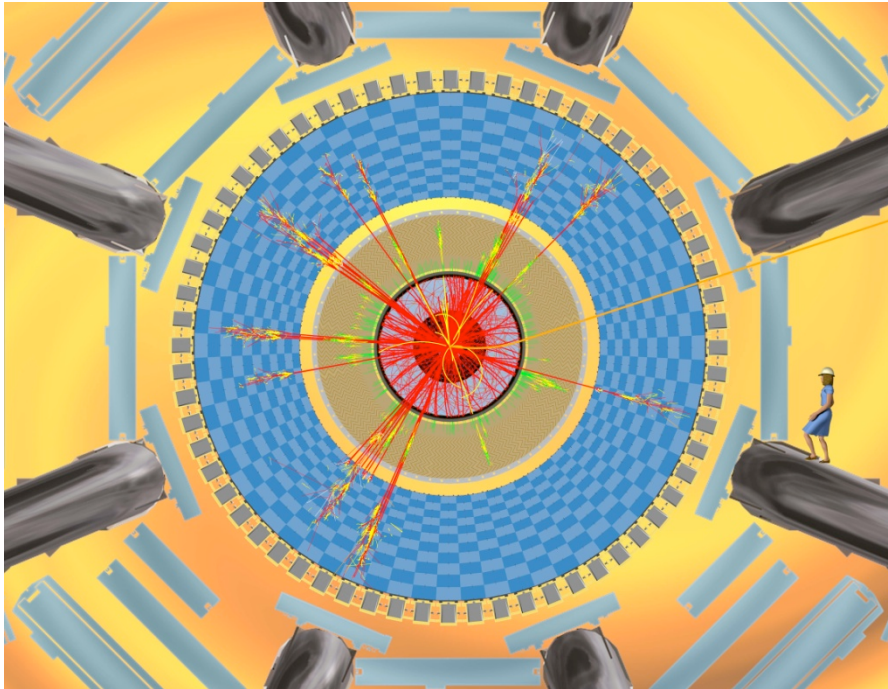
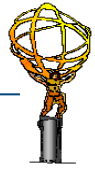


Bericht ATLAS

N. Wermes
Bonn



Deutsche Institute in ATLAS



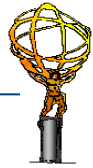
37 Countries
169 Institutions
2800 Scientific participants total
(1850 with a PhD)

Berlin (seit 2006)
Bonn (2x)
DESY (HH + Zeuthen, seit 2006)
Dortmund
Dresden (seit 2006)
Freiburg (2x)
Gießen (seit 2006)
Göttingen (seit 2007)
Heidelberg (3x, ehem. Mannheim)
Mainz
LMU München
MPP München
Siegen
Würzburg (seit 2008)
Wuppertal

13 Unis
MPP-M
DESY

BMBF- FSP 101
„Physik auf der TeV-Skala
am LHC“

Die deutsche Beteiligung in ATLAS



	2006	2008
ATLAS Autoren (qualified) (Platz 2, hinter US)	<200 ~9%	290 12%
Postdocs	~100	~150
Doktoranden	~ 80	~160

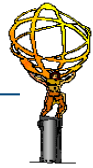
ATLAS Publikationen

2006 – 2008 Anzahl, in Klammern (Deutsche Beiträge, ohne Doppelzählung*):

ATLAS Conference Slides:	284 (31)	11%
ATLAS Internal Notes:	98 (21)	21%
ATLAS Public Notes:	391 (86)	22%
ATLAS Scientific Notes:	18 (1)	6%

* Dank an M.A. Pleier

derzeitige (größere) Koordinatorfunktionen



Physik Koordinator

Karl Jakobs (FR, bis 10/08)

Collaboration Board (Deputy Chair) Gregor Herten (FR, ab 1/09)

Standardmodell

Stefan Tapprogge (MZ)

Monte Carlo

Judith Katzy (DESY)

Tau -ID

Wolfgang Mader (DD)

Myon – Runkoordinatorin

Stephanie Zimmermann (FR)

Pixel – Runkoordinatorin

Lucia Masetti (BN, ab 1/09)

Distributed Analysis Koord.

J. Elmshäuser (LMU)

Pixel IB Chair

C. Gössling (DO)

SCT IB Chair

U. Parzefall (FR)

Trigger Monitoring

M. zur Nedden (B)

Koordinator Myon-Driftrohrkammern

Joerg Dubbert (MPP)

Publications Committee

S. Menke (MPP) und M. Schumacher (FR)

Authorship Committee

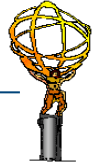
M. Schumacher (FR)

Panel of Operation Task Sharing

N. Wermes (BN)

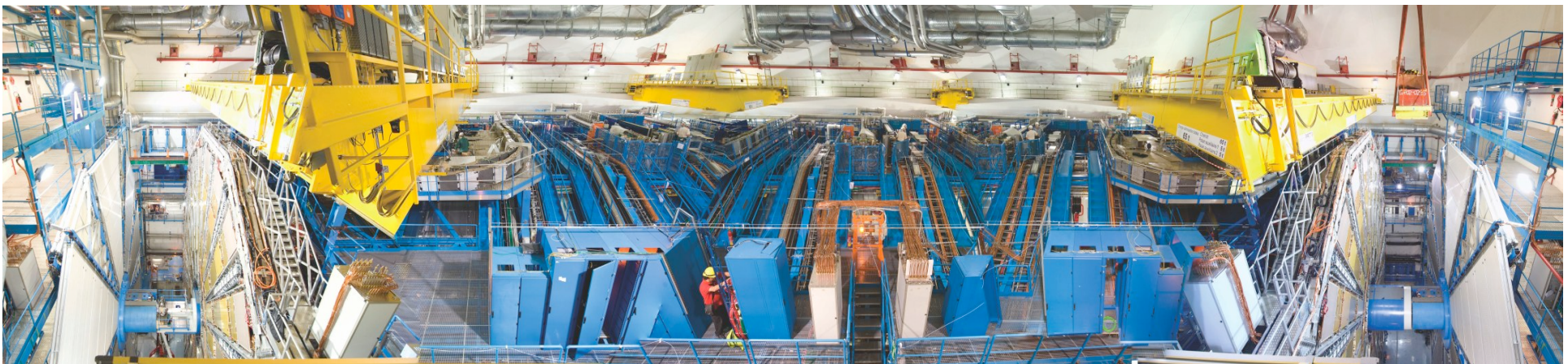
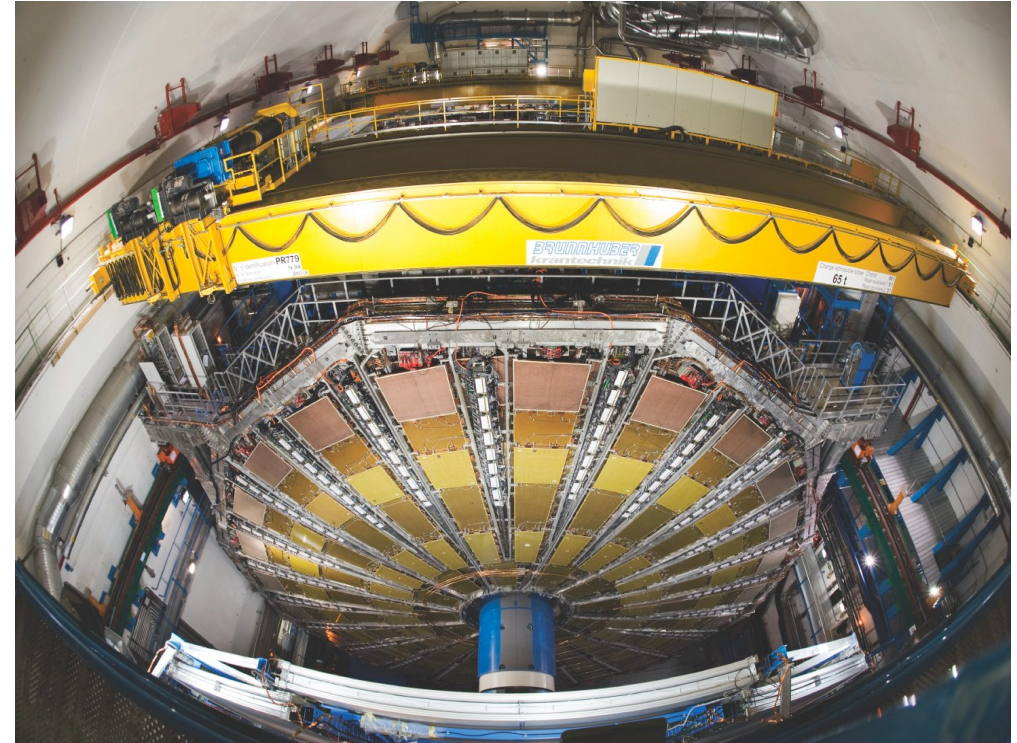
nicht vollständig

Final Closing



Keine Unfälle, keine Detektorbeschädigung
Zugang und Überwachungssysteme
funktionieren.

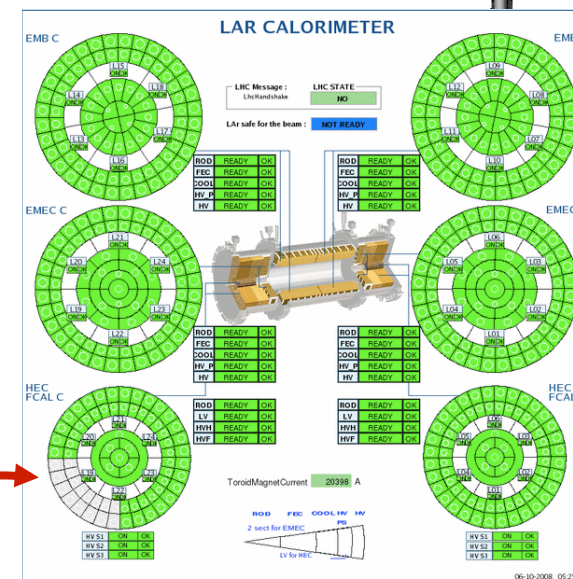
Zugangsbereitstellung zu (noch)
problematischen Komponenten
(ID Kühlung, etc) nach dem "closing".

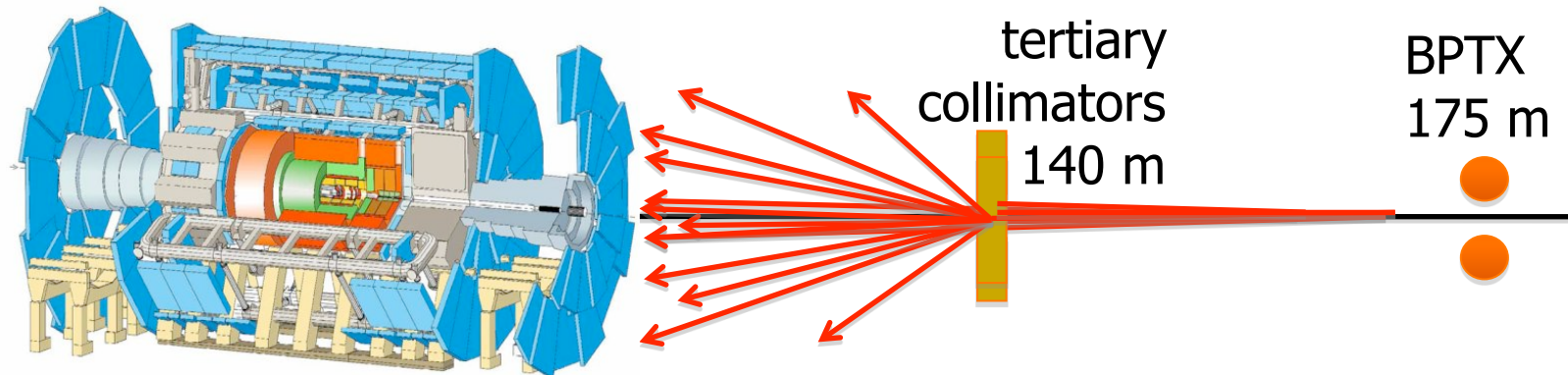
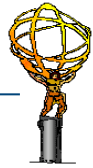


ATLAS Systeme



Pixels	85/88 cooling loops running >16 modules lost (0.92 %)
SCT	114/116 cooling loops running 36 modules problematic (0.88%)
TRT	~2% problematic channels
Liquid Argon	31/182468 channels dead (0.2%) LV Power Problem (→fixed in shut down)
Tile Calorimeter	1.4% problematic channels
Myon System	MDT/CSC/TGC = 1.5%/0.1%/0.1% problematic channels
L1 Trigger	fully installed, still much commissioning work with stable beams needed myon part stable up to the nominal 100 kHz
HLT & DAQ	ReadOut (ROS) fully installed, LVL2 & Evt-Filter fully installed (still reduced processing power), HLT routinely online





- Myon System (MDT, RPC, TGC) an reduzierte HV
- Liquid Argon (-FCAL HV) und Tile Calo an
- TRT an, SCT reduzierte HV, Pixel aus
- BCM, LUCID, MinBias Szintillatoren, Beam Pickup Zähler (BPTX) an
- L1 Trigger Processor, DAQ funktionsfähig, HLT bereit (aber nur für “streaming” benutzt)

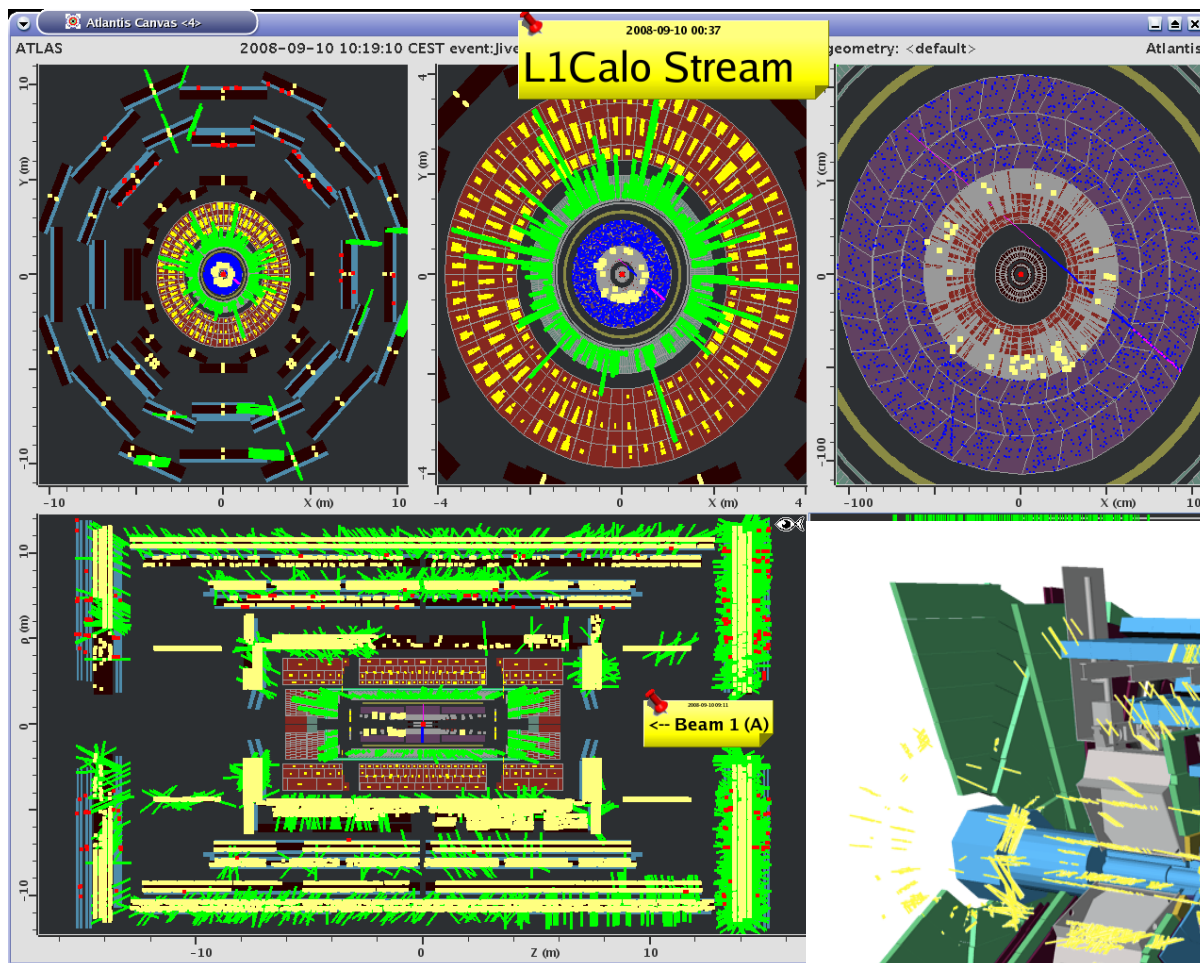
... kein Vorabtest der Auslese, keine R/O Synchronisierung. Nur extrapoliert von Cosmics-Runs

..... es funktionierte ... erster Schuss, erste Bilder ... jede Menge Energie/Hits im Detektor

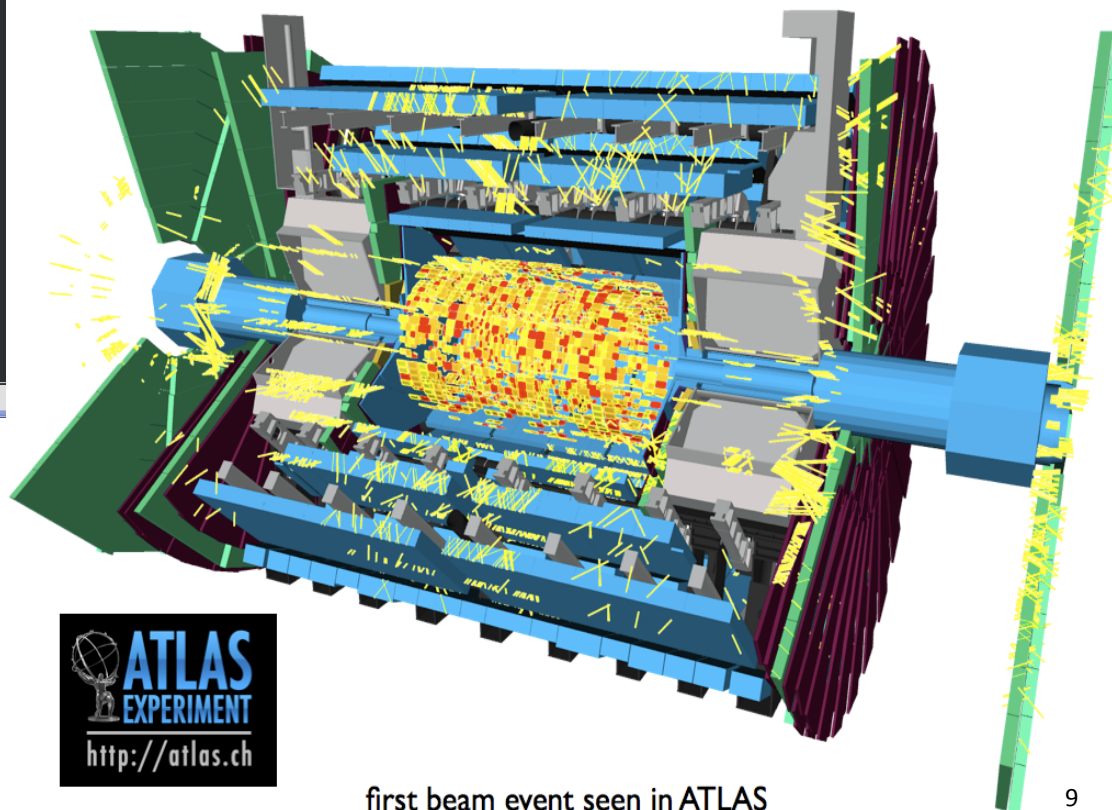
ATLAS ist voll betriebsbereit

10/09/2008





Online display

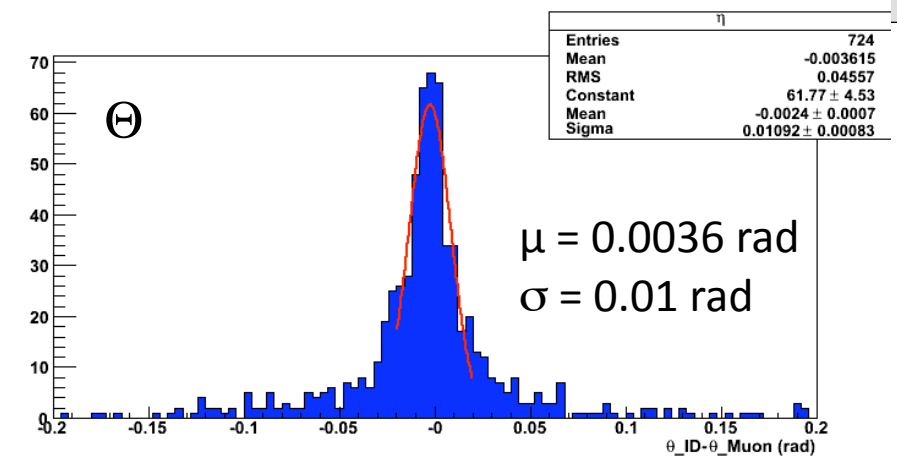
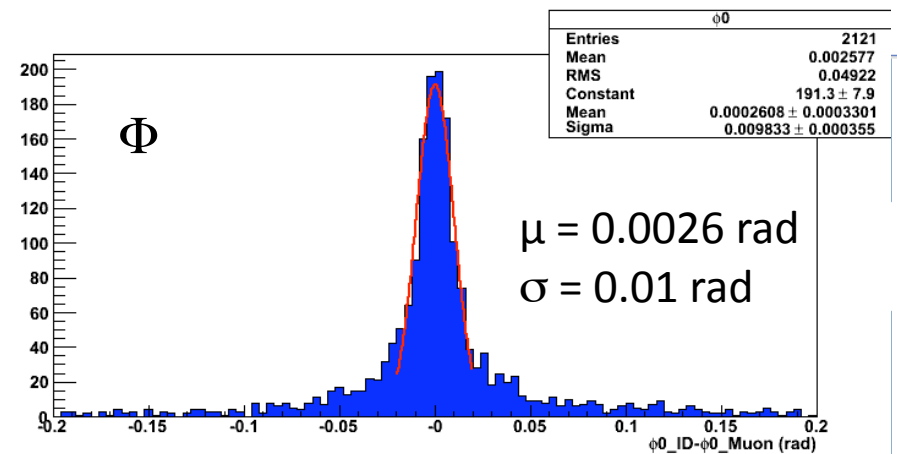
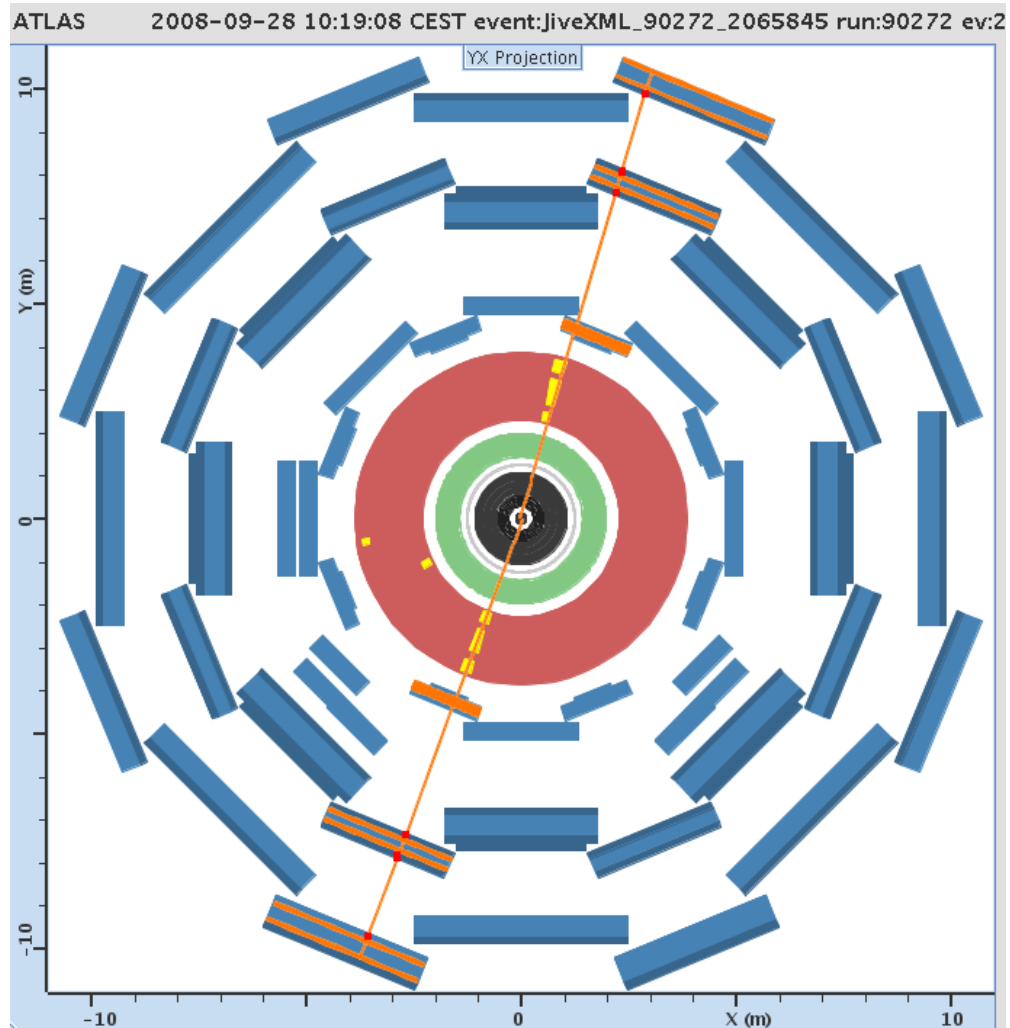


first beam event seen in ATLAS



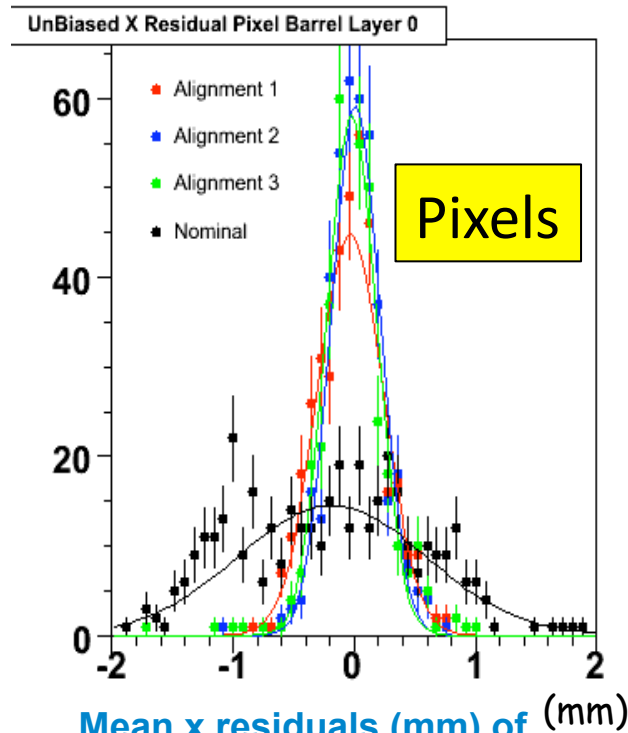
The very first beam-splash
event from the LHC in
ATLAS
on 10:19, 10th September
2008

Höhenstrahl Ereignisse

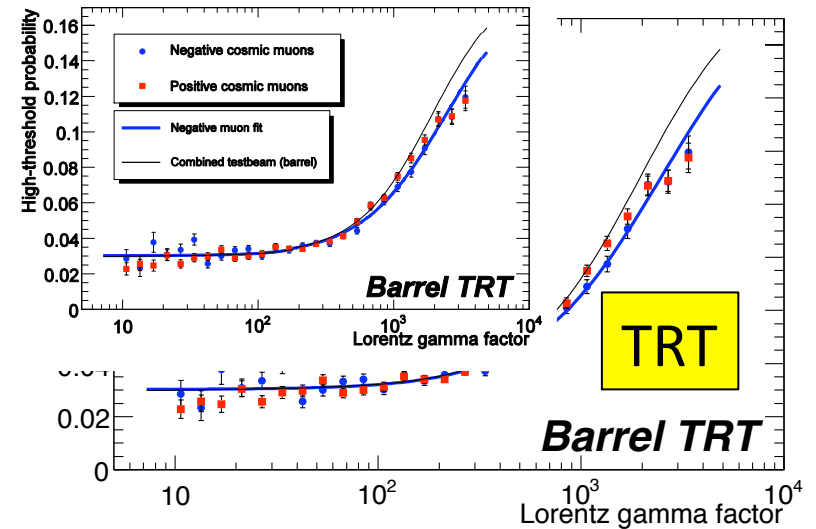


Matching of tracks
between muon system and inner detector

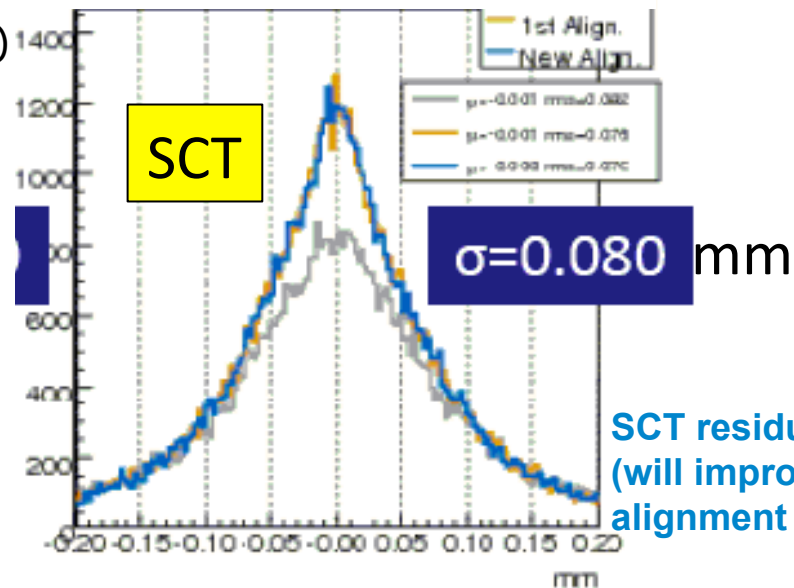
Beispiele ID Inbetriebnahme



Mean x residuals (mm) of pixel barrel layer 0 (after various alignment steps)

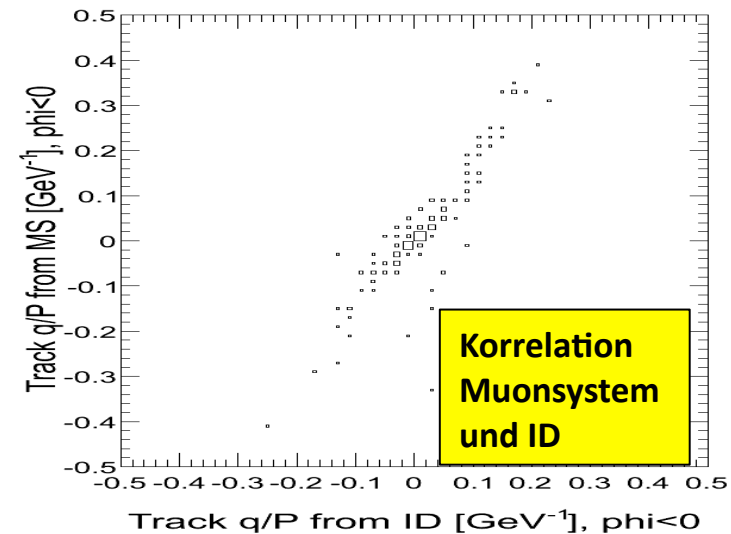
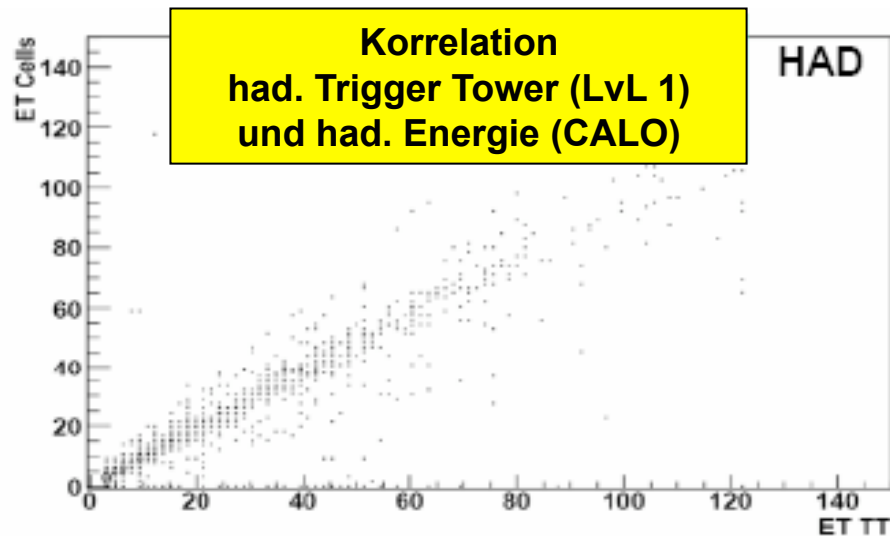
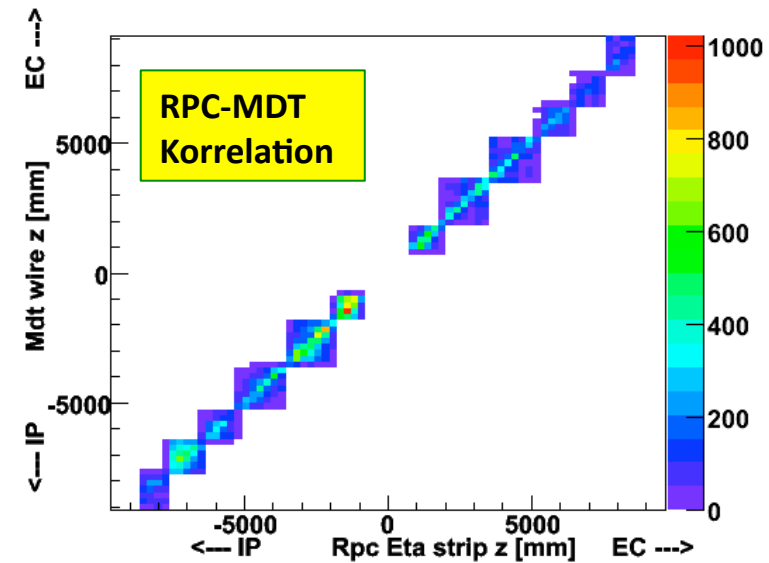
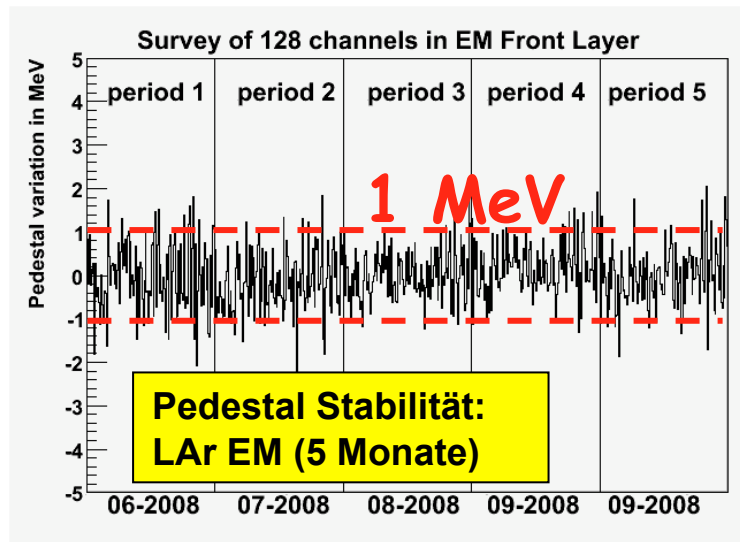
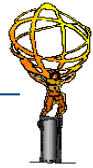


Turn-on of transition radiation produced from cosmic muons

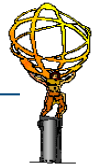


SCT residuals (will improve with better alignment and calibration)

Inbetriebnahme Kalorimeter – Myonsystem -Trigger



Deutsche Beiträge zu diesem Erfolg



Pixels **Bonn, Dortmund, Siegen, Wuppertal**

seit 2008: Berlin/DESY, Göttingen, MPP-M

SCT **Freiburg, MPP-M**

TRT --

LiqAr (HEC) **MPP-M, Mainz, Wuppertal**

seit 2006: Dresden

Tile Calo --

Myon (MDT) **Freiburg, LMU, MPP-M**

seit 2008: Würzburg

L1 Trigger **Heidelberg, Mainz**

seit 2006: Hamburg (Software)

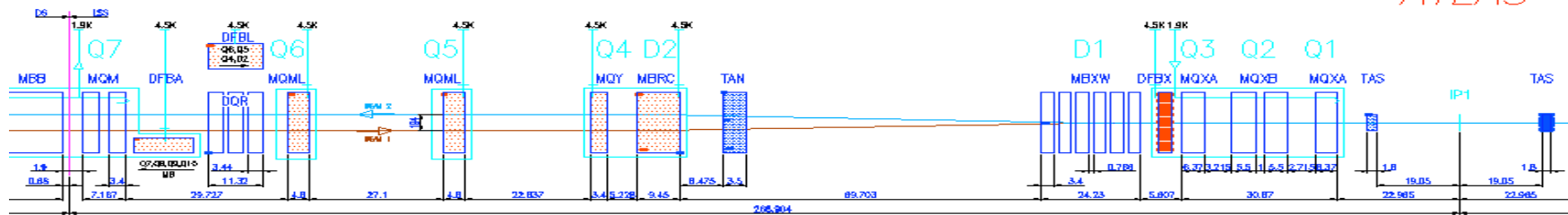
HLT/DAQ **Mainz, Mannheim (jetzt HD)**

seit 2006: Berlin, DESY, Göttingen, Hamburg

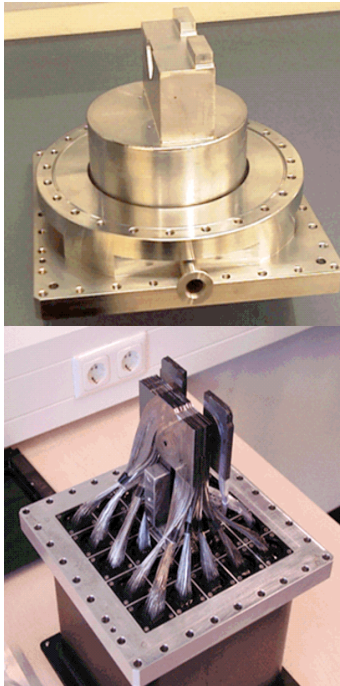
neu: ALFA Berlin, DESY, Gießen

seit 1994
nach 2006

Vorwärtsdetektoren in ATLAS

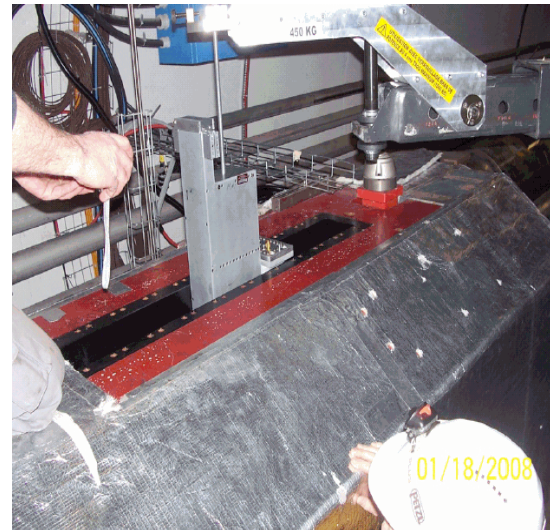


ALFA at 240 m



**Absolute
Luminosität
Einbau: 2009**

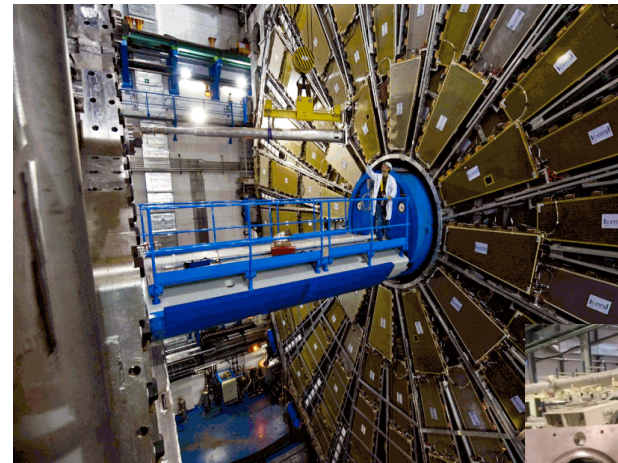
ZDC at 140 m



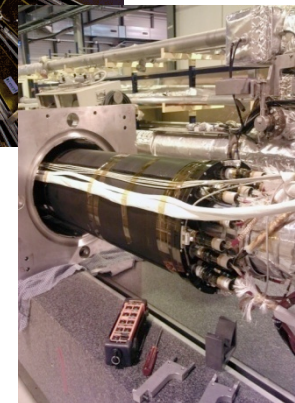
**Zero Degree Calorimeter
(HI Physik & Luminosität)**

**plus: Interner Lol für künftige
Forward Proton Detektoren bei 220 m and 420 m**

LUCID at 17 m



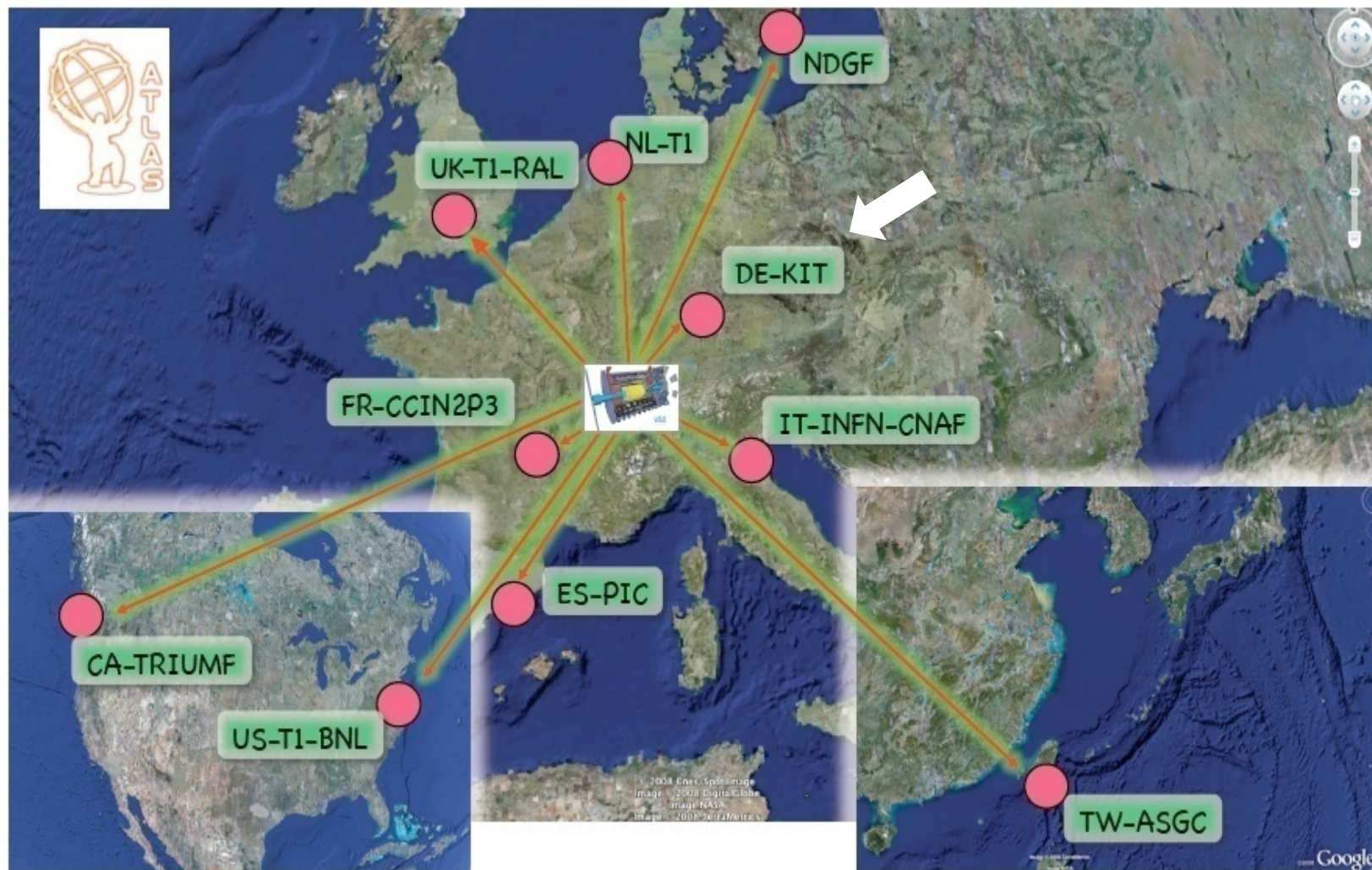
**Luminosity Cerenkov
Integrating Detector
(Phase-1 Detektor
in Betrieb)**



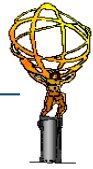
Computing in ATLAS



wLCG Grid: Tier-0 and the 10 ATLAS Tier-1s



Die deutschen Tier-Zentren



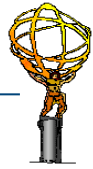
1 Tier-1
3 Tier-2

-DESY/GÖ
-FR/W
-LMU/MPP M.



Unterhalt
der Zentren
durch
substantielle
Manpower
(z.T. gemeinsam
finanziert)

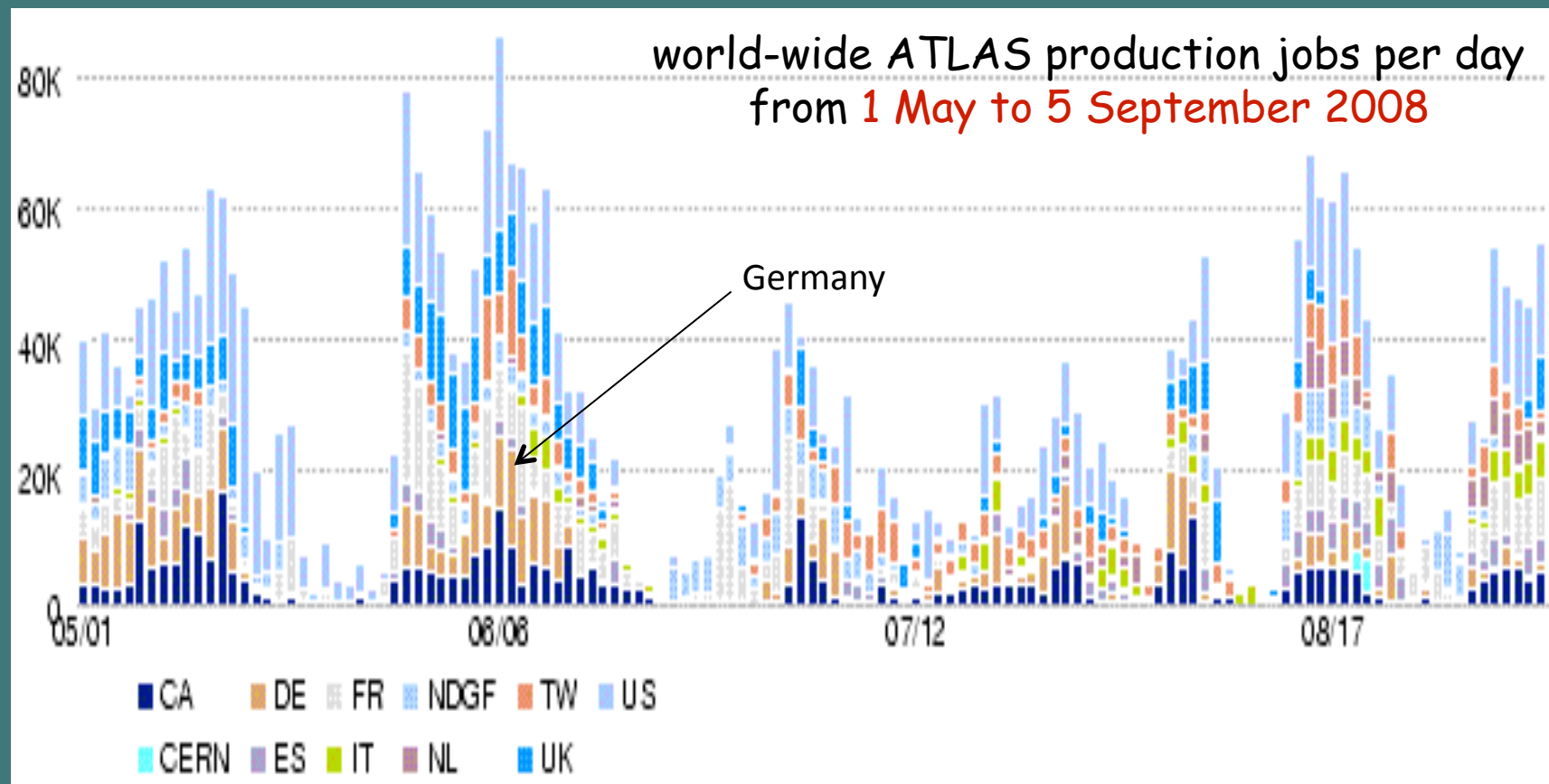
Full Dress Rehearsal (FDR): Echtfallsimulation



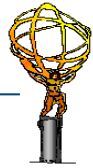
- Start bei Point 1, wie für echte Daten
- Prozessierung am CERN Tier-0 (Kalibration u. Alignment)
- Transfer zu Tier-1s and Tier-2s zur Physikanalyse

Zwei “FDR runs”
(Februar und Juni-Juli)

Komplementär zu “milestone runs” mit echten Daten, aber “Cosmics”



Physikinteressen der dt. Gruppen



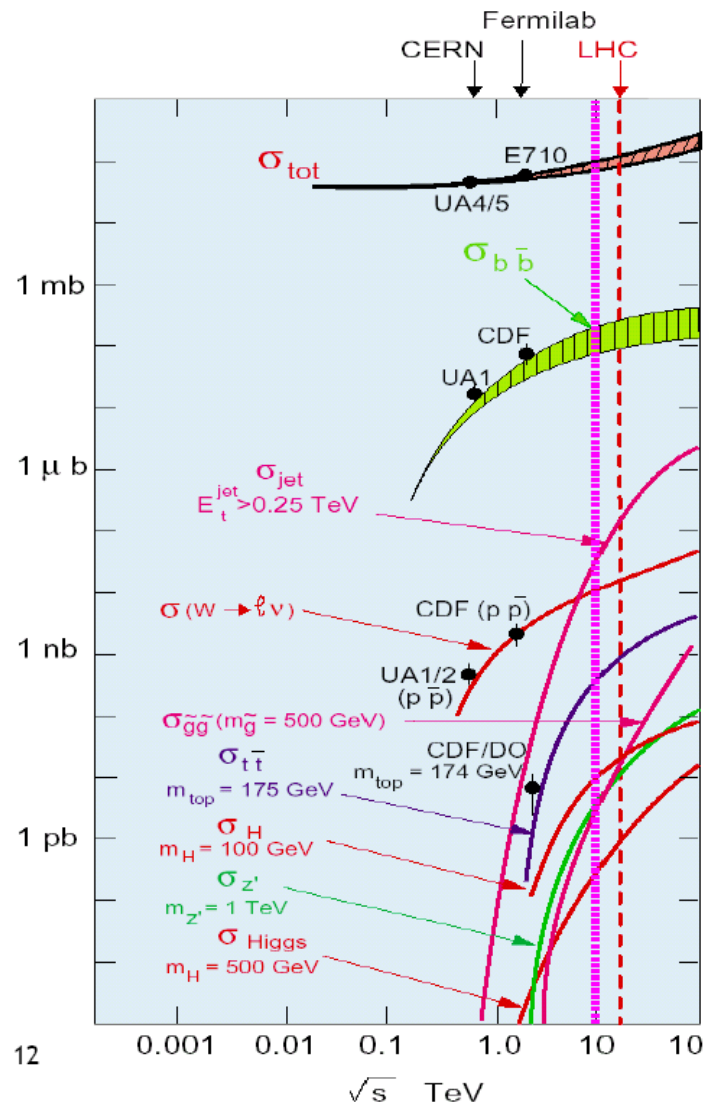
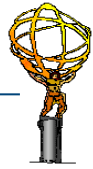
	Luminosität Elast. Strg	QCD	Elektroschw Std. Modell	Bottom	Top	Higgs	SUSY	Exotika
HU Berlin	✓				✓		✓	✓
Bonn		✓			✓	✓	✓	
DESY	✓	✓	✓		✓		✓	
Dortmund					✓			
Dresden			✓		✓	✓		
Freiburg						✓	✓	✓
Giessen	✓	✓						
Göttingen					✓	✓	✓	
Heidelberg		✓					✓	✓
Mainz		✓	✓			✓	✓	✓
LMU-M			✓		✓	✓	✓	✓
MPP-M		✓	✓	✓	✓	✓	✓	✓
Siegen				✓	✓			
Würzburg							✓	
Wuppertal					✓	✓		✓

“Tooling” für die Analyse

- MC
- b, μ , e/ γ und τ -ID
- Jets und missing E_T
- Alignment

schnelles und präzises MC
ATLFAST II (FR, BN, MZ, Desy)

Erste Daten 2009 (10 TeV, 100 pb⁻¹?)



Minimum bias (non-diffractive) cross section ~ 70 mb

Mit 10 pb⁻¹ (“on tape”) erwarten wir:

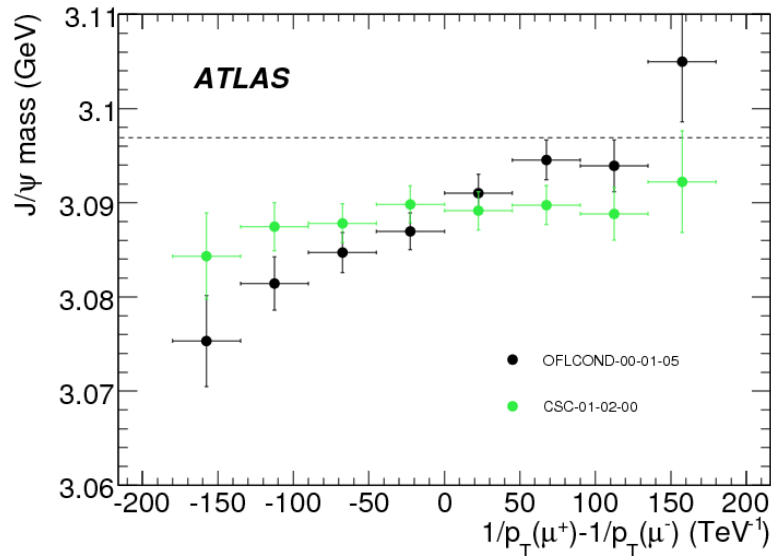
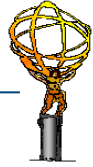
- 10^5 $W \rightarrow e\nu$, and $W \rightarrow \mu\nu$
- 10^4 $Z \rightarrow ee$, and $Z \rightarrow \mu\mu$
- 10^3 $t\bar{t} \rightarrow qq b(e/\mu)\nu b$

Zuerst: Detektor verstehen

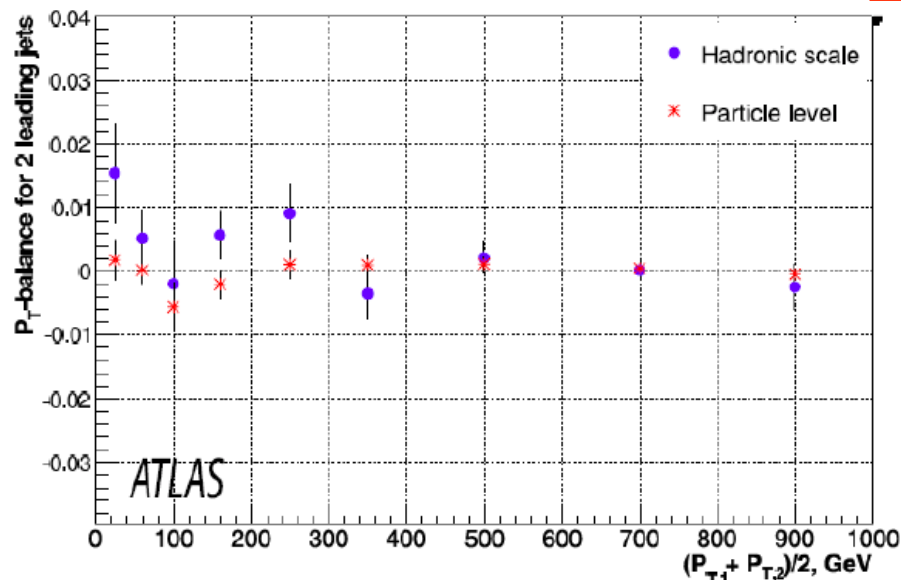
→ Trigger + Ereignis-Rekonstruktion

→ Minimum bias Ereignisse studieren
 ~ 80 Hz at 10^{27} cm⁻²s⁻¹

Beispiele



← Spuren im ID (dann 2nd VTX, b,τ-ID)
(Bonn, Dresden, DESY, Freiburg, MPP, Siegen, Wuppertal)
J/ψ Masse vs $1/p_T$ Ladungsasymmetrie
(2 verschiedene Alignments, Simulation)



Jets (Bonn, Freiburg, Heidelberg, MPP)

p_T Balance von Di-Jets

$A = (p_T^{\text{probe}} - p_T^{\text{ref}}) / \frac{1}{2}(p_T^{\text{probe}} + p_T^{\text{ref}})$
("Bias" auf % Niveau, Simulation)

Myonen (Freiburg, Göttingen, MPP, LMU, WZ)

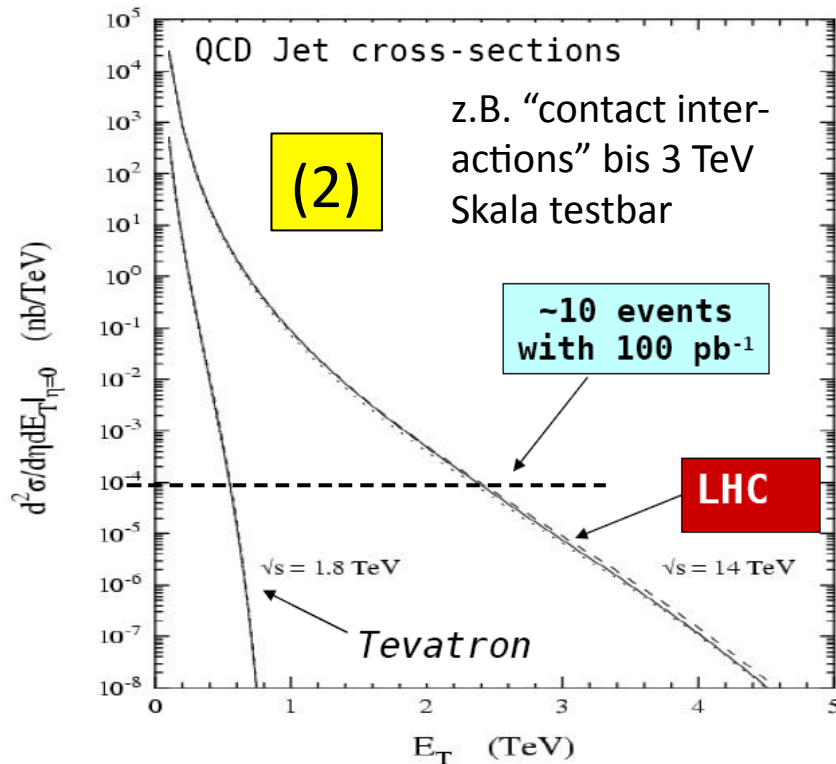
Effizienzen, p_T Auflösung u. Eichung

- J/ψ → μμ, Z → μμ "tag-and-probe"
- orthogonal trigger in e-μ events

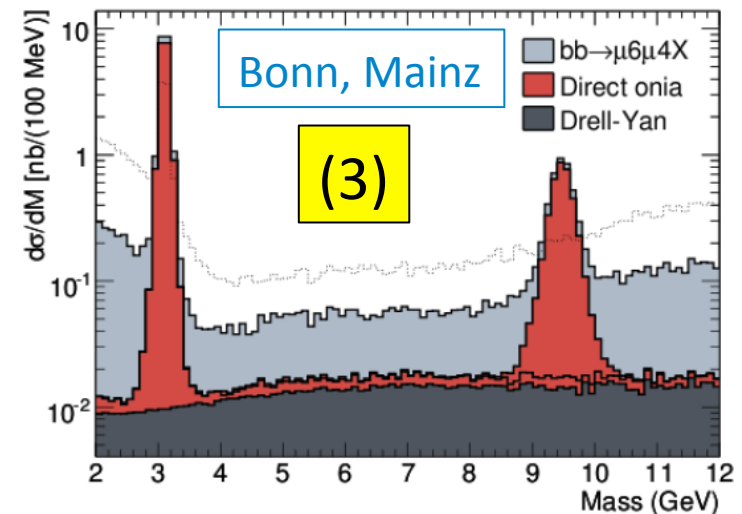
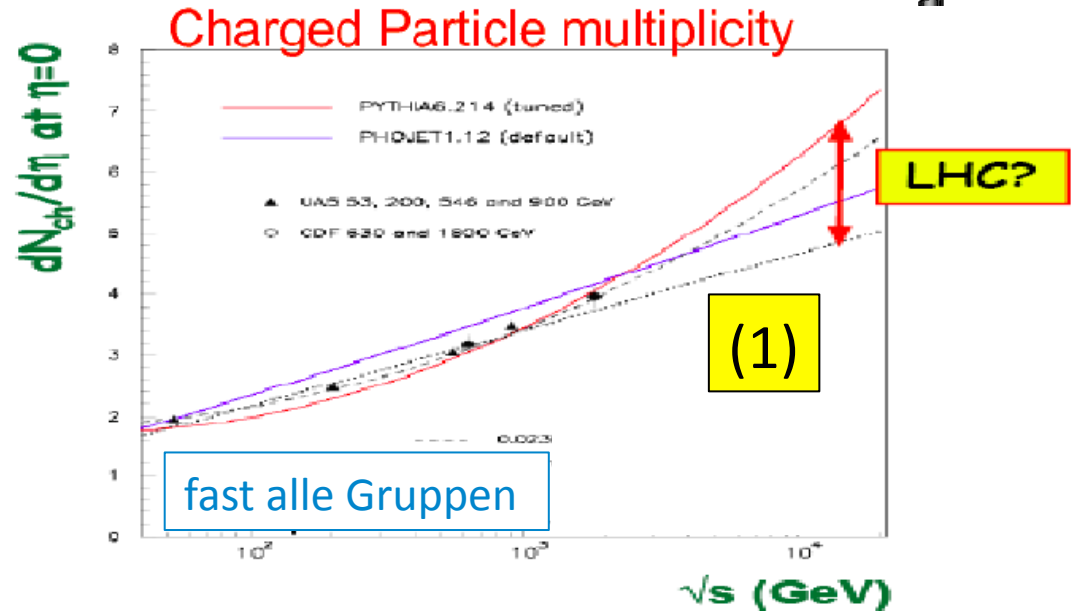
Mit 10 pb⁻¹ in 2009 ...



- (1) Minimum Bias
- (2) QCD Jets und b-Jets
- (3) ~100 000 J/ψ pro 10 pb⁻¹
- (4) elast. Streuung, Vorw. Physik



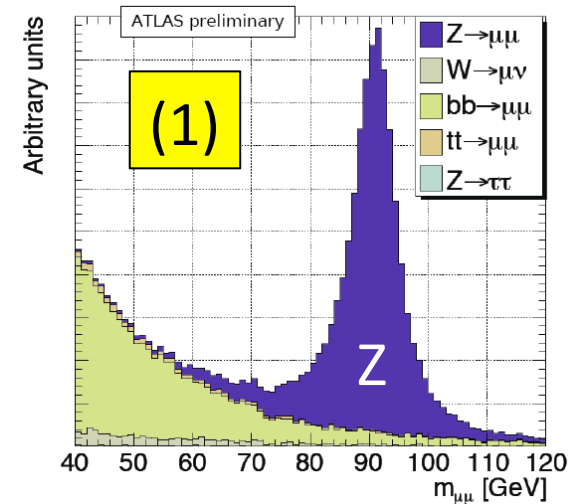
Freiburg, Heidelberg, Mainz, Siegen



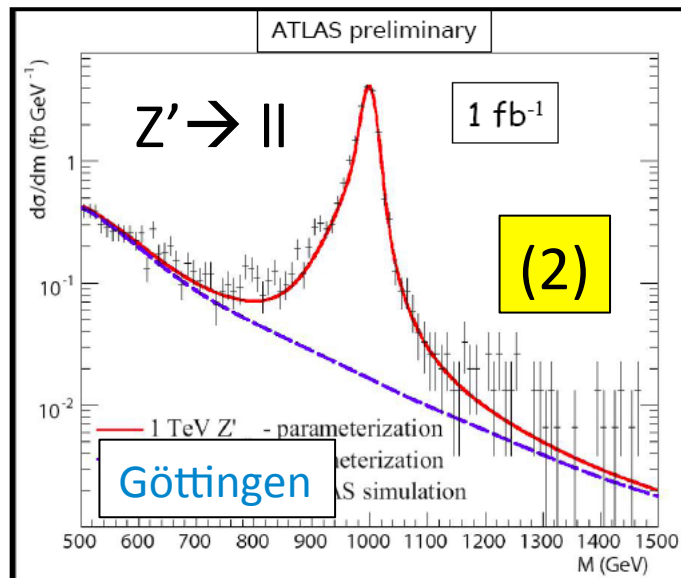
... und



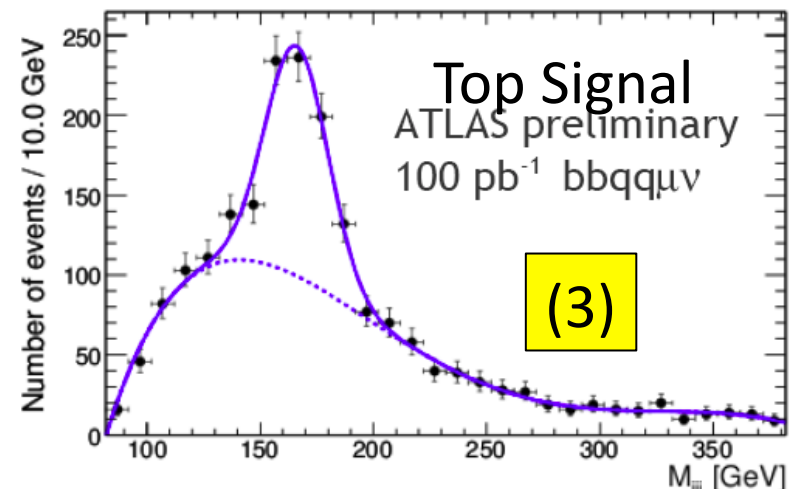
- (1) W,Z - Wirkungsquerschnitte
- (2) "neue Physik" z.B. $Z' \rightarrow \ell\ell$
- (3) top – Physik ($\sigma = 830$ pb)
- oder sogar ...
- (4) ein frühes SUSY Signal



Bonn,
DESY,
Dresden
Freiburg,
Göttingen,
Hamburg,
LMU,
Mainz,
MPP



(4) **SUSY:** Bonn, DESY, Freiburg,
Göttingen, Hamburg, Mainz, LMU,
MPP, Würzburg

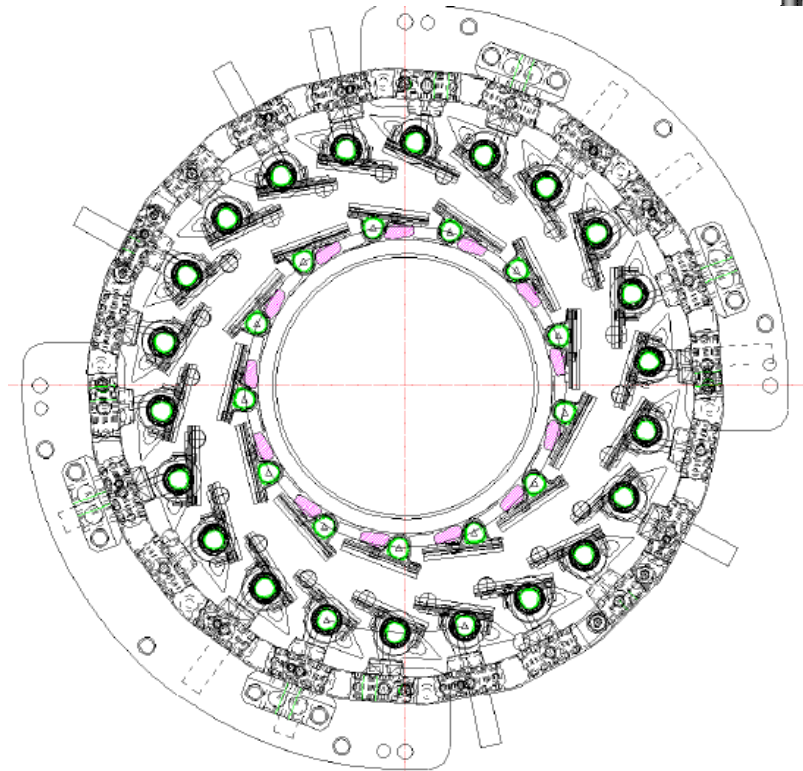


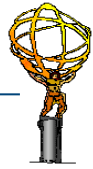
Bonn, DESY, Dortmund, Dresden,
HU Berlin, Göttingen, LMU, MPP, Wuppertal

Upgrades ...**vor** und **für** sLHC



- **Insertable Pixel B-Layer**
 - ~2012
 - BN, DO, GÖ, SI, WU
- **ATLAS Forward Project**
 - AFP (220m und 420 m)
 - ~2011
 - B/DESY, GI, HD
- **Reparatur und Ersatz**
 - LiqAr, MDTs, Trigger
 - DD, FR, LMU, HD, MPP, MZ





- **Innendetektor (Pixels & Streifen)**

- neue Sensoren
- neue FE-Elektronik
- neue Modul- und Auslesekonzepte
- Verbundfaserstoffe für Tragestrukturen

B, BN, Desy,
DO, FR, GÖ,
HD, MPP, SI,
WU

- **Liquid Argon**

- neue FE (SiGe) und BE-Elektronik

DD, MPP, HD

- **Myon-System**

- ratenfeste Kammertypenentwicklung
- großflächige Micropatterndetektoren

FR, LMU,
MPP, WZ

- **Trigger**

- Neukonzeption 1. Triggerstufe

HD, MZ



ENDE