



# Overview of LU's Experimental High Energy Physics group activities

Oxana Smirnova, Partikeldagarna 2008, Stockholm, 2008-10-16

# Division at a glance

HEP-EST  
(Marie Curie)

<http://www.hep.lu.se>

p-p collisions

Heavy ion collisions

e-p collisions

e<sup>+</sup>-e<sup>-</sup> collisions

ATLAS

ALICE

PHENIX

H1

ILC

New physics:  
supersymmetry,  
Higgs,...  
CP-violation

Quark-gluon  
plasma,...

Proton  
structure,...

New physics,  
precision  
measurements

Grid

Software

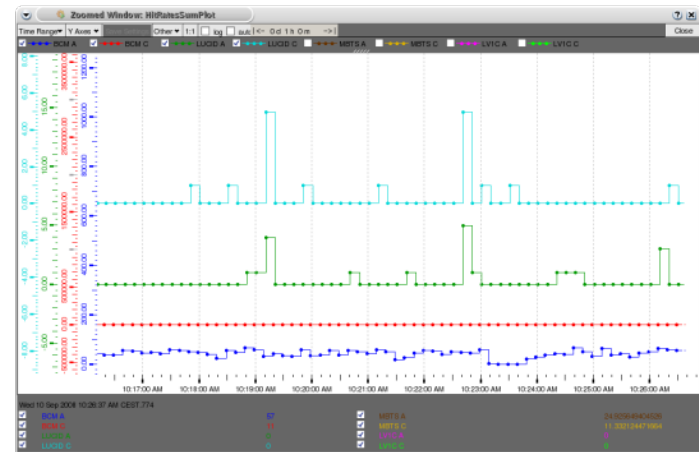
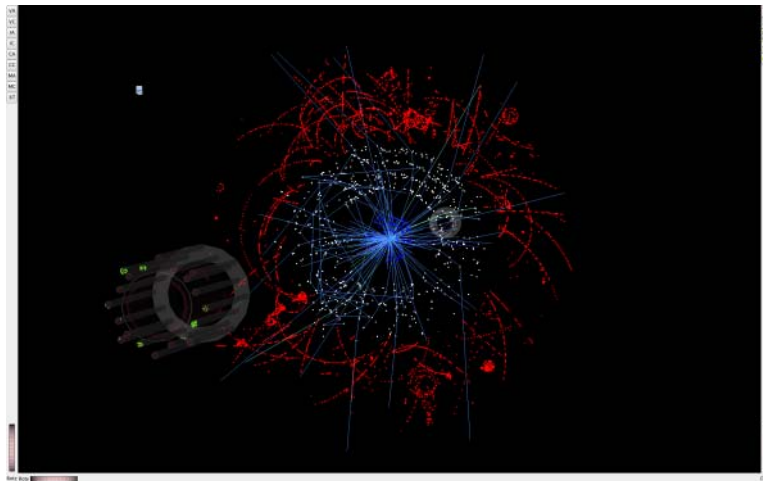
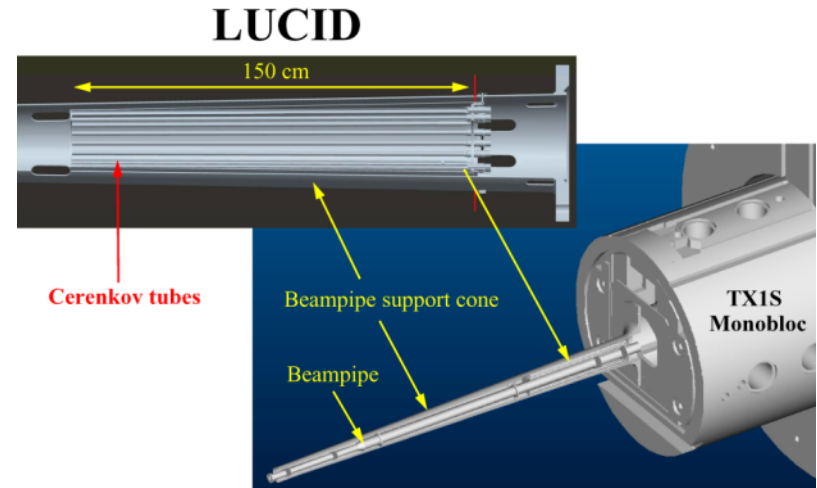
Electronics

# ATLAS

- People:
  - Alejandro Alonso, Nele Boelaert, Jacob Groth-Jensen (students), Vincent Hedberg, Göran Jarlskog (emeritus), Weina Ji (student), Björn Lundberg (engineer), Oxana Smirnova, Torsten Åkesson, Paula Eerola (now in Helsinki)
- Activities (in no particular order):
  - Luminosity measurements
  - Shielding of muon spectrometer
  - QCD
  - Off-line data quality monitoring
  - B-physics
  - TRT calibration
  - Inner Detector alignment monitoring
- Just an overview here; more details in other presentations

# Luminosity measurements

- LUCID detector
  - Saw the first beam in the LHC on the 10th of September
  - Work on adapting MC description for the ATLAS s/w framework
  - Involved: Vincent Hedberg, Jacob Groth-Jensen, Björn Lundberg



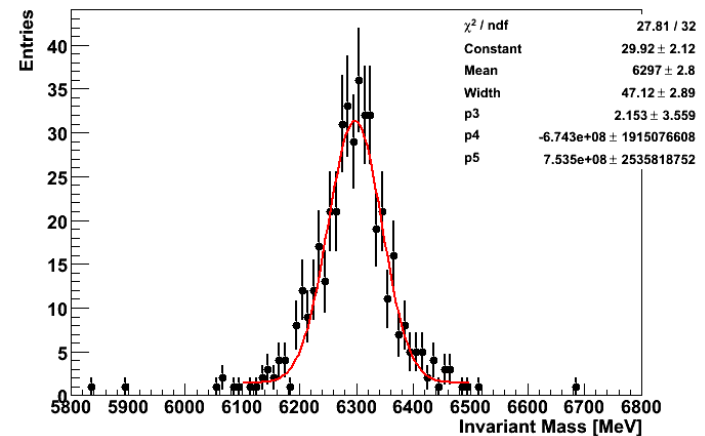
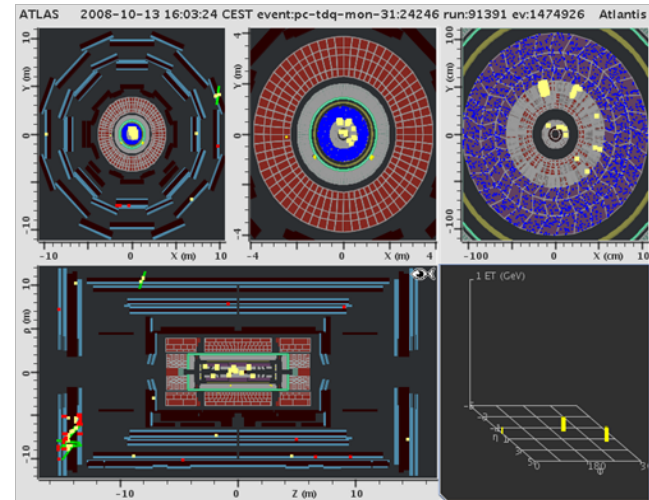
# Shielding of the muon spectrometer



- Disk and forward shielding, installed during 2008
- Complicated operation requiring many years of planning; involved: Vincent Hedberg

# Physics studies, monitoring, alignment, calibration

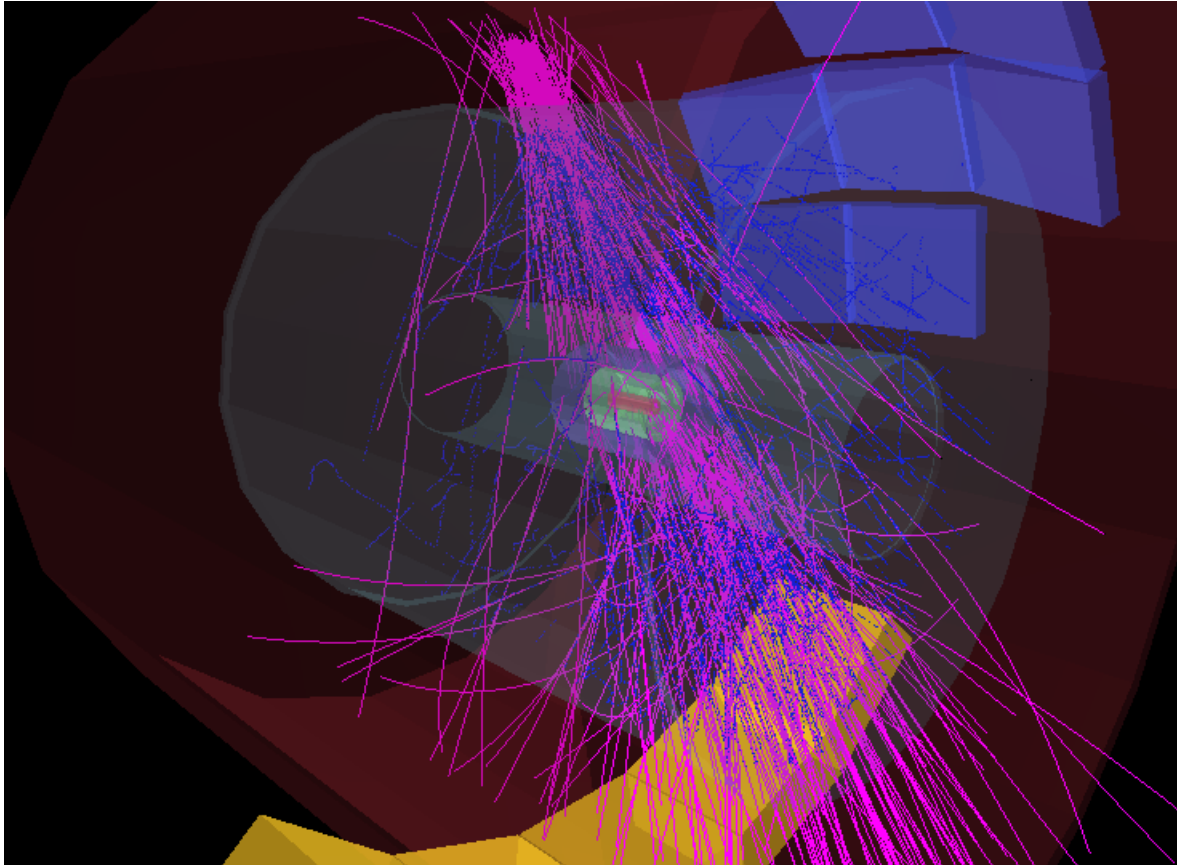
- Dijet angular distributions (Nele Boelaert)
- $B_c$  searches (Weina Ji)
- Charged particles multiplicity, jet component (Alejandro Alonso)
- Offline Data Quality monitoring (Nele Boelaert)
- Inner Detector alignment monitoring with  $J/\Psi$  and  $\Upsilon$  (Weina Ji)
- TRT offline calibration (Alejandro Alonso)



# Heavy Ion Physics

- People: Peter Christiansen, Alexandru Dobrin, Philippe Gros (students), Hans-Åke Gustaffson, Eva Haslum (student), Anders Oskarsson, Evert Stenlund, Lennart Österman (engineer)
- Activities:
  - PHENIX (Run 8) and ALICE (Commissioning) shifts
  - PHENIX Pad Chambers Maintenance and Operation
  - ALICE TPC Commissioning
  - LHC Experiment/Machine paper (ALICE part)
  - $\pi/K$  fluctuations (PHENIX): E.Haslum, PHENIX note in prep.
  - ALICE R-hadron study: A.Dobrin, ALICE public note
  - TPC Simulations: P.Gros, ALICE public note, NIM paper in prep.
- See talks tomorrow

# A cosmic ray event in the ALICE TPC

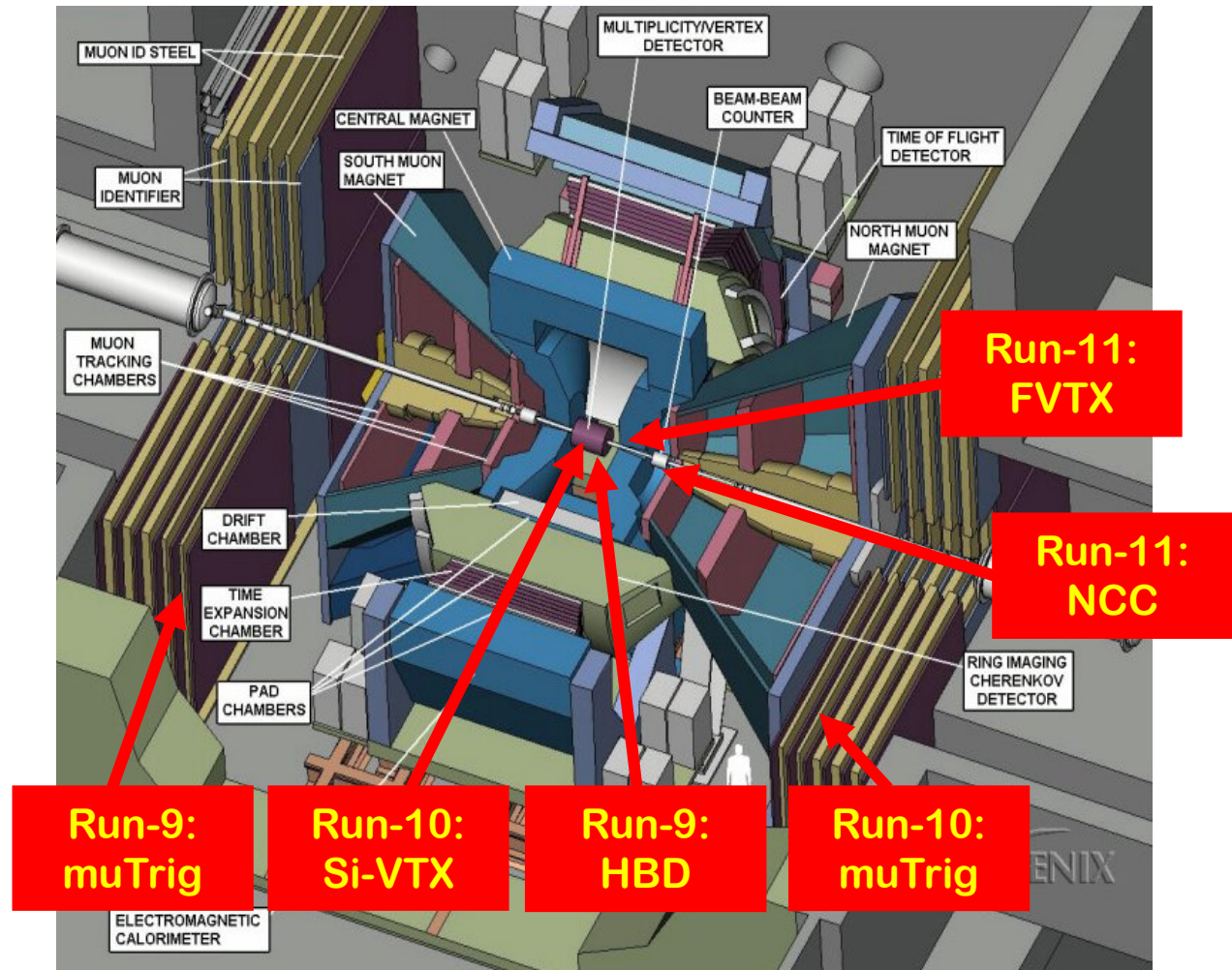




# PHENIX 5 year upgrade plan 2009->

Year=run-no + 2000

- HBD-Hadron blind detector for Dalitz rejection
- Si-VTX vertex detector, barrel
- FVTX- inner Si, forward/backward
- NCC, small angle calorimeter
- mu-trig improved muon trigger
- Upgrades, ca 25% full Detector cost



# PHENIX @ RHIC, 5 year plan 2009-2013

<b>RUN</b>	<b>SPECIES</b>	<b><math>\sqrt{s_{NN}}</math> (GeV)</b>	<b>PHYSICS WEEKS</b>
<b>9</b>	<b>p+p Au+Au</b>	<b>200 or 500 200</b>	<b>10 or 5 ~10</b>
<b>10</b>	<b>p+p p+p Au+Au</b>	<b>500/200 62.4,39,28, 22.4 62.4, 39. 28</b>	<b>5 or 10 2.5 15</b>
<b>11</b>	<b>Au+Au  p+p</b>	<b>200  500</b>	<b>M  25-M</b>
<b>12</b>	<b>U+U p+p</b>	<b>200 200</b>	<b>N 25-N</b>
<b>13</b>	<b>p+p  Au+Au</b>	<b>500  various</b>	<b>Q  25-Q</b>

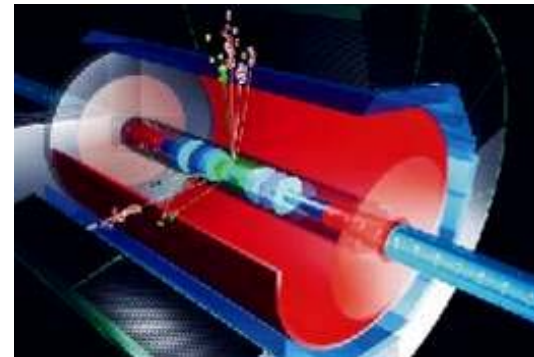
65% polarisation for pp  
Does  $J/\Psi$  flow as the quark liquid  
Low mass dilepton enhancement

Reference data for Au Au  
Energy scan, onset of quark liquid?  
Complete VTX detector  
Do b quarks flow?

60% larger E-density than AuAu

# H1, ILC

- H1
  - People involved: Leif Jönsson, Sakar Osman (student)
  - See talk of Leif Jönsson on recent results in small-x physics
- ILC
  - People involved: Leif Jönsson, Vincent Hedberg, Björn Lundberg, Ulf Mjörnmark, Anders Oskarsson, Evert Stenlund, Lennart Österman
  - EU EUDET project
  - TPC detector development



# Grid activities in Lund

- People:
  - Philippe Gros – Ph.D. student (NGIn – ALICE applications)
  - Balázs Kónya – NorduGrid, KnowARC
  - Ulf Mjörnmark – NorduGrid, KnowARC
  - Oxana Smirnova – NDGF, NorduGrid, KnowARC
  - Johan Jönemo (now in Uppsala)
- Projects:
  - **NorduGrid** – a consortium that initiated the following projects (technical coordinator - B.Kónya):
  - EU **KnowARC** – develops new Grid middleware; Lund provides the Technical Coordinator (B.Kónya)
    - Design and early working prototypes are ready
  - **NDGF** – NOS-N funded, Nordic Grid Infrastructure, Tier1 for LHC computing; Lund provides the CERN Coordinator (O.Smirnova)
    - Tier1 is set up and running, participates in ALICE and ATLAS production
  - **NGIn** – Nordunet3 project; focus on grid education and applications
    - 4 PhD students in Nordic countries (P.Gros in Lund)



KnowARC

