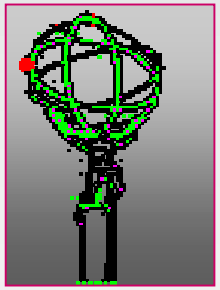


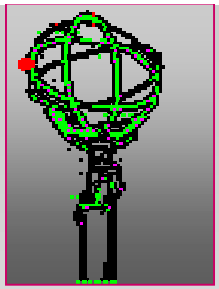
lcg/physics validation meeting

ATLAS (muon)

status on physics validation studies

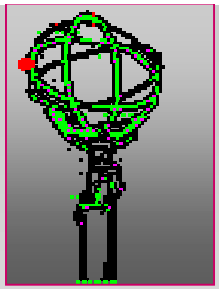
CERN, 30 July 2003

adele rimoldi
University of Pavia & INFN, Italy



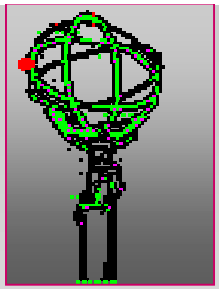
combined testbeam programme in Atlas

- Exploiting the pre-commissioning strategy
  - Testbeam as a small scale experiment
- Follow with simulation the evolving of setup
  - ID + C
  - ID + M
  - ID + C + M
  - C + M
  - C + LVL1
  - M + LVL1M
- Exploit the simulation tools
  - At the price of a modified application specific geometry
    - in most cases, not all
    - already in place or in fieri



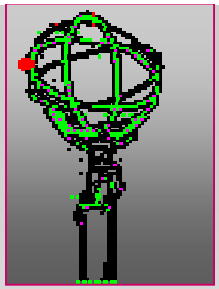
Atlas Testbeam Simulation Project

- As a *global* and *coherent* task it is at its starting point
- Geant4 is the reference tool
  - Already in place for all subdetectors
  - A more detailed simulation in most cases respect to the one for the global system
    - e.g. the Muon System
- Used for
  - Validation of Geant4 physics
  - Possible analysis and correction of construction problems
    - chambers misalignements: few 10**6 muon events already produced to study the chamber misalignement and possible offline recovery
  - Tune of reconstruction programs with known event types
  - Use and test of Athena framework

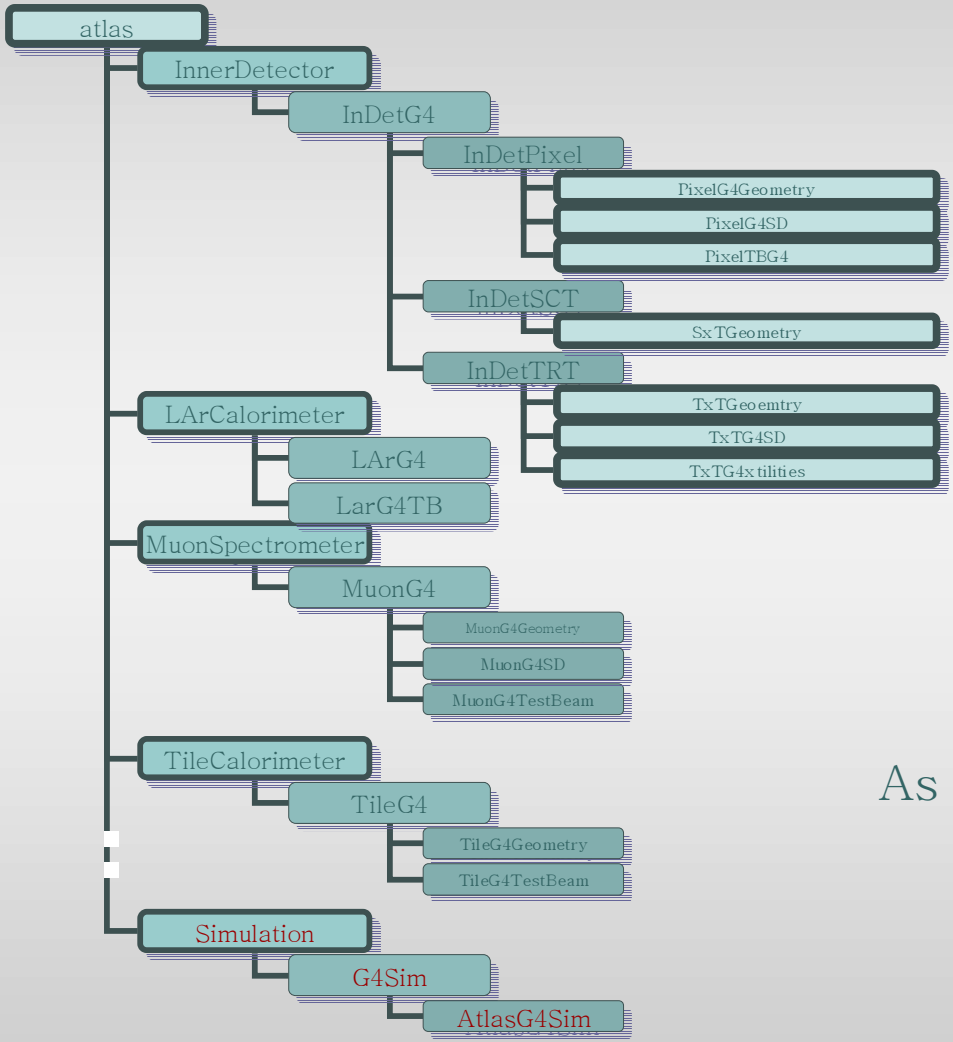


Athena 6.5.0, Geant4 and status

- Geant4: we moved to geant4.5.2
  - Athena rel. 6.5.0
- Detailed geometry for all detectors
  - Missing bits here & there being addressed
  - Combined tests starting
- Hits for all detectors
  - Attempt at common approach
  - Hit persistency: under implementation now
    - ID, Muon, Tile

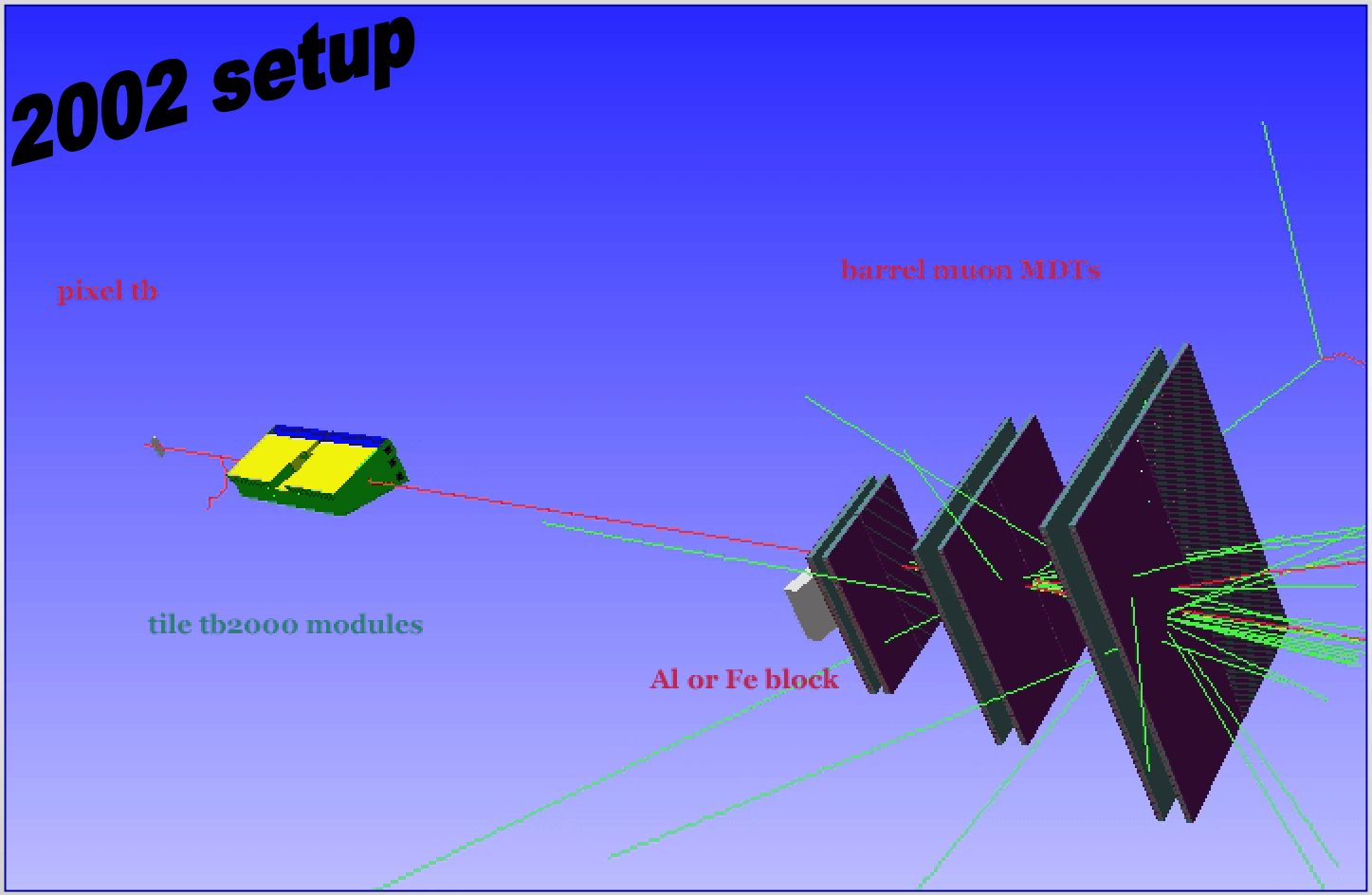


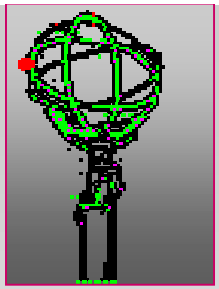
Athena Atlas Simulation Packages



As of 28/07/03

The Muon Testbeam Simulation





2003 Illusion & reality at H8..

- After problems about
  - Readout electronics – solved
  - Mdt reading – solved
  - RPC reading – mostly solved

  We are facing with a SPS vacuum leak and no beam for a week (to this Friday)

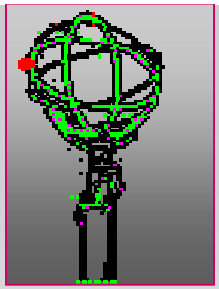
  The programs are delayed or partially canceled

  next week the situation will be resumed

  the material tests will be put in place for the endcap setup

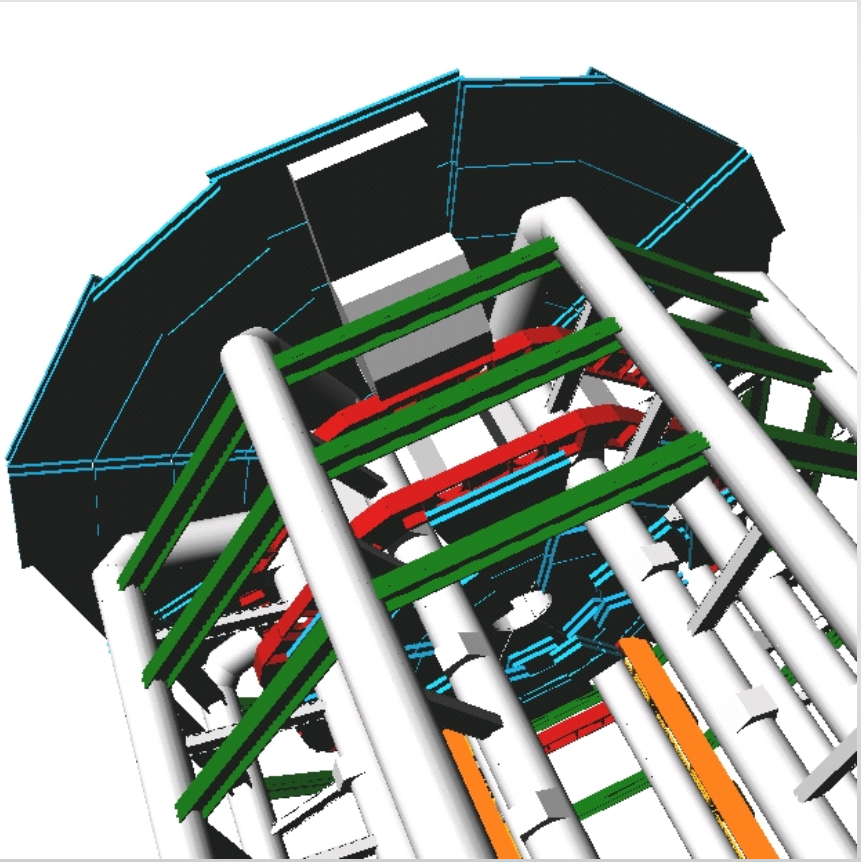
  we have a team developing the new geometry setup and working in connection with the Moore people to provide data samples for reconstruction

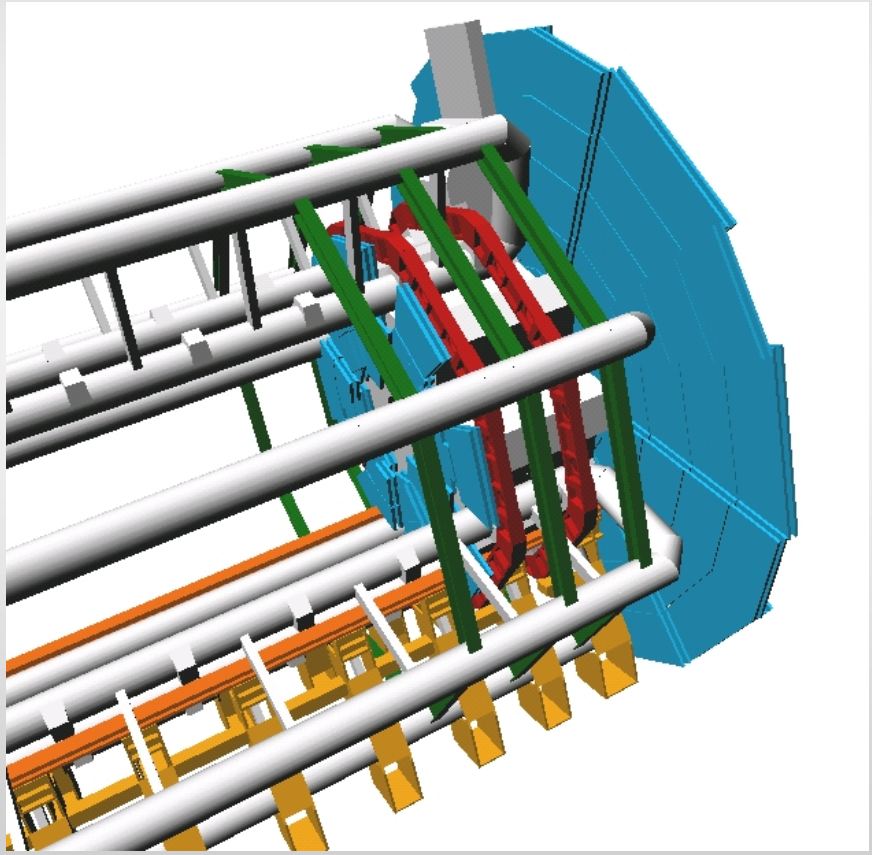
  (in addition to Muonbox)

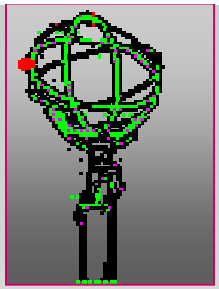


2003 studies for special testbeam setup

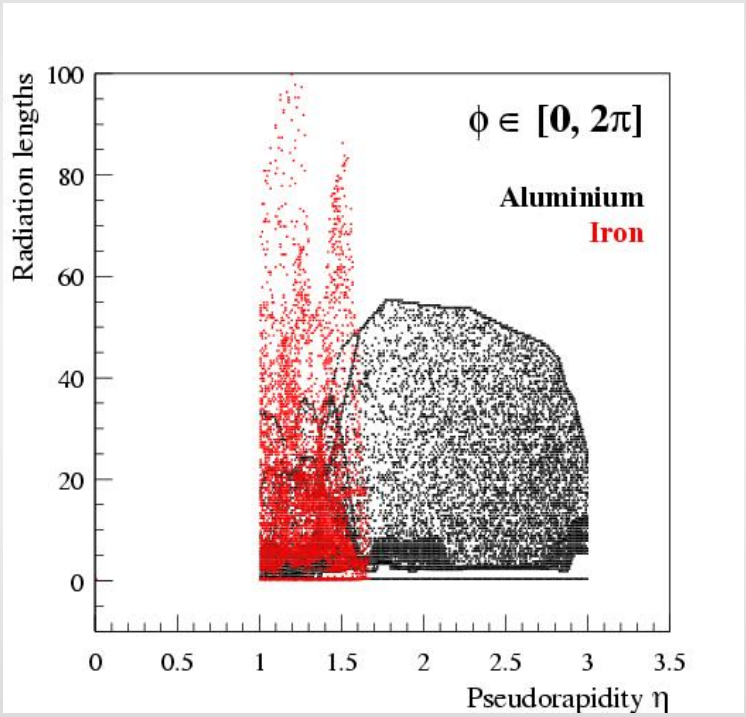
material in front of muon chambers

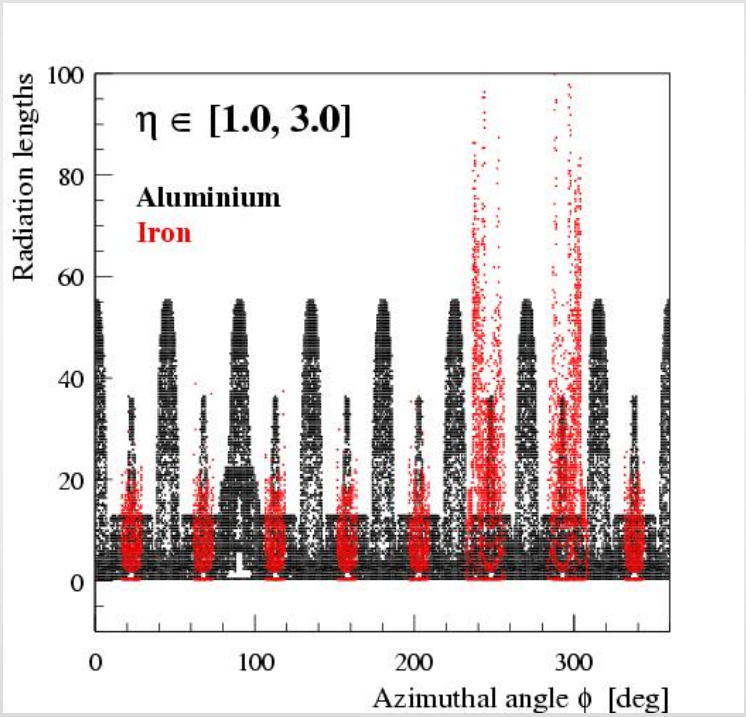




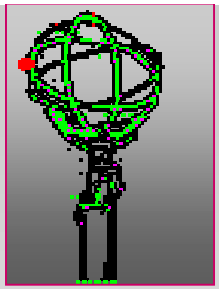


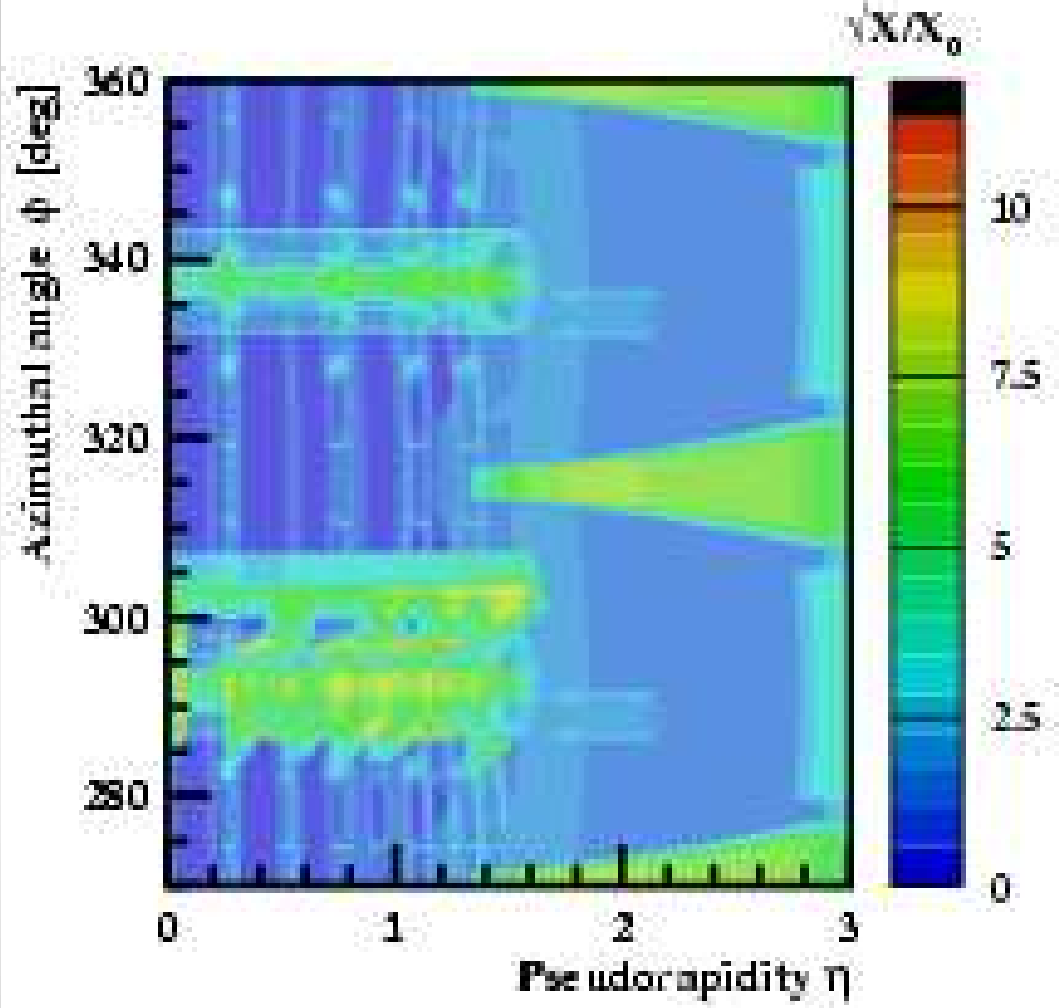
G4/G3 comparisons under way

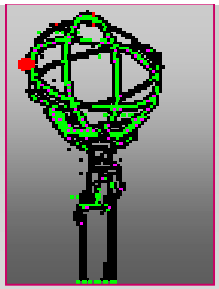




G4 results consistent with G3 DICE (muon TDR 1997)




$\sqrt{X/X_0}$
Azimuthal angle φ [deg]
360
340
320
300
280
0
1
2
3
Pseudorapidity η
10
7.5
5
2.5
0



Recent results

- ATL-COM-MUON-2003-014
  - *Geant4 Simulation and Comparison with Reconstructed Muon Events at the H8 Testbeam. by: Policicchio, A; Cerutti, F; Rebuzzi, D; Rimoldi, A ; - 4 june 2003*
  - Results already presented by D.Rebuzzi (Atlas Software Week/Phys Validation Meeting)