Status of ATLAS Simulation with GEANT3

Pavel Nevski, BNL

Geometry Update

New I/O facilities

Production Status

Atlsim in ATHENA

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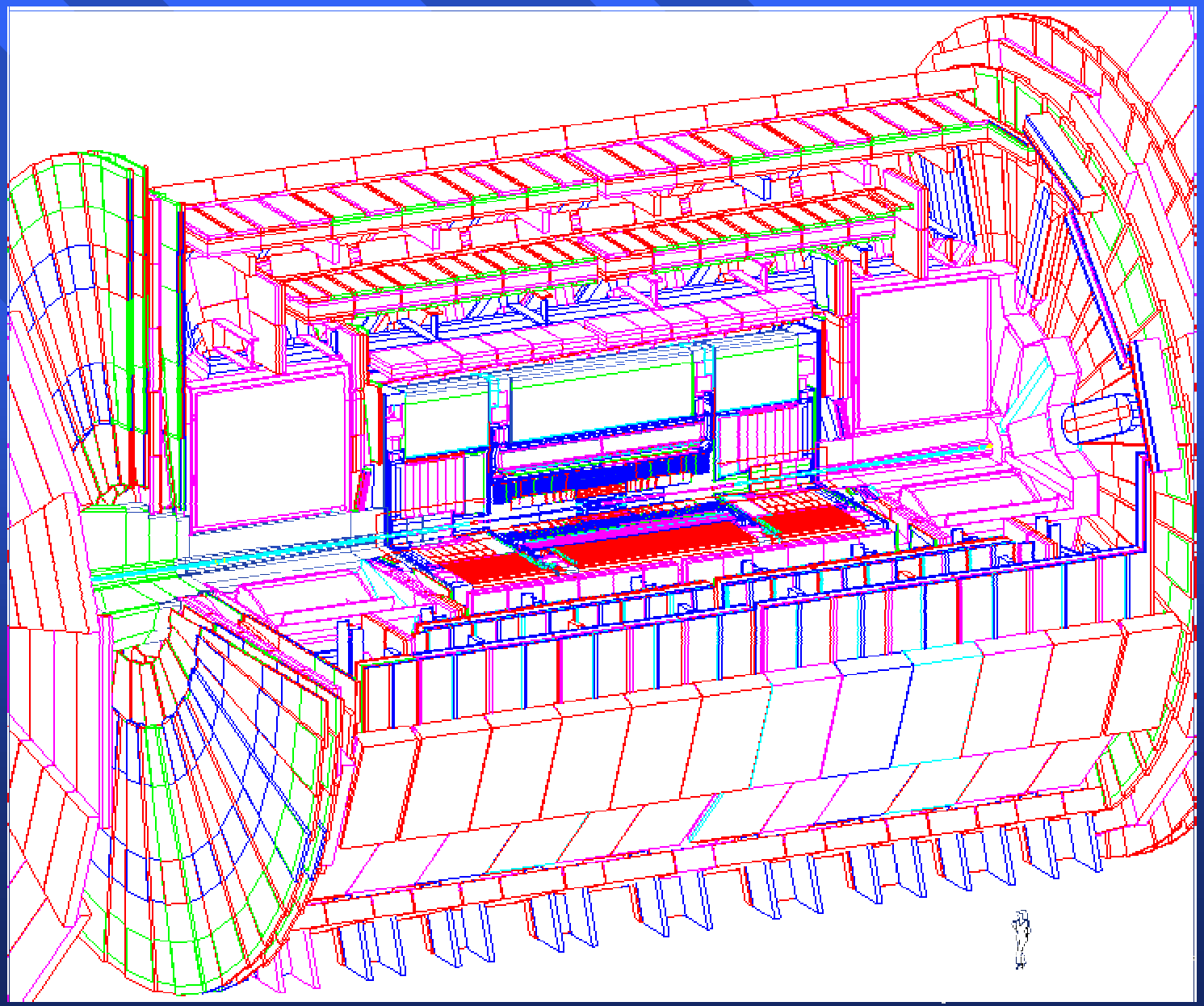
ATLAS Geometry Status

-Inner Detector

-Calori meters

-Muon System



Inner Detector Status

- Recent modification after dc0 (since December):
  - Pixels – more information kept in HITS, better digitization
  - TRT – bug fix in digitization
  - Services – minor material updated

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Calorimeters Status

- ACCB: readout updated
  - three last strips in compartment 2 are read as one
- ENDE: readout not updated yet
  - Two last strips should be read as one
- Reminder:
  - End-Cap Calorimeters shifted by 4 cm

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Muon System Status

- Latest design using amdb p.03
  - More detailed chamber cutouts
- Tested to be compatible with ***Muonbox*** reconstruction

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New I/O facilities

- ROOT event I/O module:
  - Based on relatively simple objects (Tables)
  - Requires one additional shared library (eventually it will go to ROOT itself)
  - Can read both old and new format
- Tagged, but not yet in 3.2.0 …

  (problems with requirements ?)

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Production Status

- No problems observed during the test production
- Since release 3.2.0 all shared libraries used in the production are done in the release
- In latest releases (since 3.0.0 ?) optimized version runs as slow as the debug one

  (twice more time needed to simulated same events)
  but still reliable…

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Atlsim in ATHENA

- The goal is to provide an updated ***atlsim*** library for all G3 related access
- AtlsimSvc module build based on the standard AtlsimMain program

  (thanks to Srini)
- Seems to work …
  - Apart from dynamic invocation

    (the core of atlsim control)
- Should appear in the release soon

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Conclusions

- Atlsim-Dice is a stable production tool based on GEANT3
- ATLAS detector evolution is followed by the G3 geometry model
- Ready to run in DC1

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Production Status

- About 200 K events successfully processed
- No major problem observed
- Main loss – lost jobs at the level of 2-3 %
- Sometime machines were suddenly switched off
- Occasionally LSF counts time few (twice or even three) times faster then ***rusage***
- 2 jobs lost due to malloc error in Objy interface
- 1 job stopped in GCALOR

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Atlsim-Dice Framework

- Kuip control instead of FFREAD
- Improved memory management
- No hard limits on track/vertex/hit numbers
- Improved documentation handler
  (no RZ files, no RZ size problem)
- Latest physics improvements
  - GCALOR is the base line hadronic package
  - Infinite loops eliminated in GCALOR
  - K0 always traced by GEISHA

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Few Numbers at a Glance

- 25,5 millions distinct volume copies
- 23 thousands different volume objects
- 4,673 different volume types
- Few hundred pile-up events possible
- About 1 million hits per event on average
- Geometry update follows

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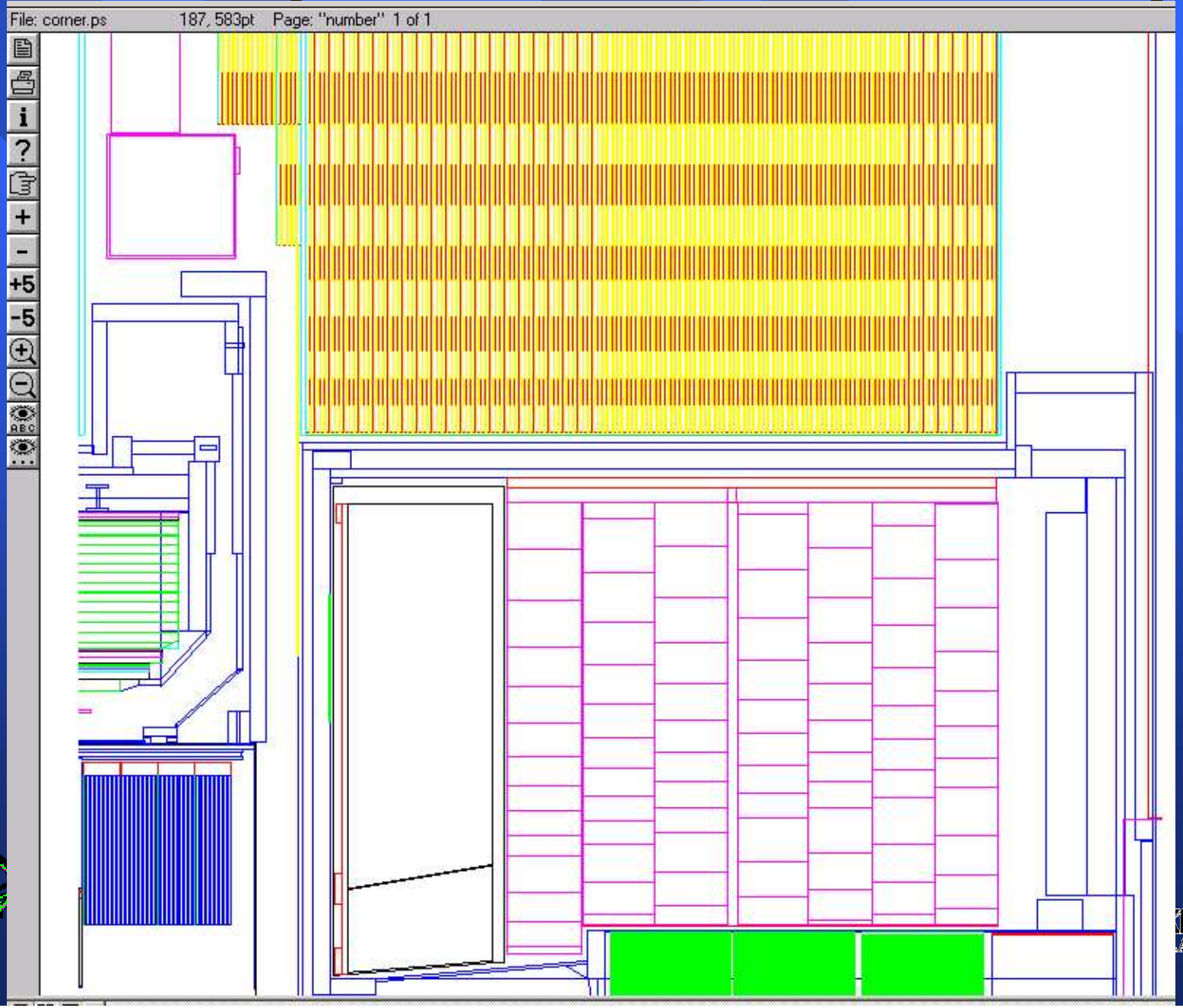
End Cap Calorimeters Geometry



Atlsim-Dice Production Status

- Objectivity interface in place and tested
- Multi-processor run with common input
  - Typical input may contain many thousands physics events
  - Atlsim jobs maintain a local DB to process common input coherently
- Processing time per job is about 24 hours
- Typical output file size for 170 – 320 events (with hits and digits) is 200 – 300 Mbytes

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Planned Modifications (for DC1 ?)

- Modifications in the queue:
  - Cryostats split into Barrel and End-cap
  - Understand tracking accuracy problem (targeted for 3.0.0)
  - ROOT I/O – Parameters, Geometry, Kinematics, Hits/Digits
    - » first prototype targeted for DC1

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Pile-up Feature

- Different detectors have different memory time requiring very different number of minimum bias events to be read in
  - Silicons, Tile calorimeter : t<25 ns
  - Straw tracker : t<~40-50 ns
  - Lar Calorimeters : 100-400 ns
  - Muon Drift Tubes: 600 ns
- Still we want the pile-up events to be the same in different detectors !

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Pile-up Feature

- Solution is provided by a local event bank which keeps hundreds of events organized by sub-detectors.
- On every trigger at least 25 same time minimum bias events (one bunch-crossing) are read from the background input stream. The rest is taken from the local bank with a random event time assignment.
- Newly read events partially replace old events in the local bank for long-memory detectors.
- Pile-up time is 5-10 seconds per full event.

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Time dependant signal simulation

- Time with 25 ns accuracy is now available in all detectors to produce signal vs time response as it was done sometime in the past
- Should we add time of flight to all hits (some detectors already have it as the baseline – TRT, MDT) ?
- This may imply some zero-suppression to be used (may be very conservative)

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