Outlook: 2010 & beyond

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Overview

- Application areas
  - HEP, Nuclear, Rare Event
  - Medical physics
  - Space applications
- Challenges of success
  - Effort for maintenance
- Some trends
  - Tools / applications based on Geant4
  - Future platforms
- Note: this is a personal perspective

HEP

- First LHC data and comparisons are upcoming
  - Geant4 is being used for two hadronic calibration schemes by ATLAS
  - First focus on understanding detectors
  - Lots of data will be compared with Geant4 predictions (against G4 9.2 patch1 or 2 – at least initially)
    - Challenge of lots of feedback
    - Potential need to use alternative physics models, if differences are found
    - Some experiments may consider using the improved modeling available in G4 9.3
  - Reduced effort on the comparisons with important test beams
    - Risk to lose these yardsticks – which are cleaner & easier to understand

Medical Physics

- Established uses in
  - Imaging
  - Proton Therapy
- Emerging use in the hot/challenging area
  - Ion Therapy
- Competition is stiff
  - Geant4 has improved and is very competitive
- Many uses in Research are well established
- Increasing use in checking treatment planning for protons
- Hot area, with many developments ongoing

Applications built on Geant4

- Growing trend
  - We have seen new ones at this meeting
- Partial list
  - GATE, ptsSim, Gamos
  - G4BeamLine, BDSsim, ..
  - Slic (new)
- Offer starting point that speaks the language of the domain
  - Allows people familiar with the domain to start 'fast'
  - Tool to get answers for a defined set of problems
- Some users migrate to use Geant4 directly

Some considerations

Strengths

- Openness
- Flexibility
  - Physics
  - Functionality
- Configurability
- Tools

Challenges

- Steep learning curve
  - Guidance needed
  - Challenge to Document

The future platforms

- Today 8 core CPUs
  - Next year 16 cores
- In a few years
  - 100 cores or threads on a chip
  - 1000 pipelines processing units (GPUs + CPUs)