

Summary of Parallel Session 8B

The Future of Geant4 Hadronics

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Purpose

- For the most part, discussion of:
 - what we've accomplished
 - what remains to be done
 - new projects and a look several years into the future

Recent Accomplishments

- Good agreement with shower shapes
 - along with EM group, have achieved few% agreement with energy response from LHC calorimeters
 - 10 - 20% agreement with longitudinal and lateral shapes
- Advances in hadronic models
 - improved physics at all energies – LHC physics well-covered
 - retirement of LHEP and most CHIPS models
 - resulting in fewer and more stable physics lists
- Greatly expanded validation

Yet to Do

- Performance
 - better physics -> more CPU time required
 - a major focus will be speeding up hadronic code (MT, better algorithms, rethinking the physics)
- Can never have enough validation
 - more validation and testing to be developed
- Continued work on showers
 - see slide on Alberto's talk
- Increase our shielding capabilities
 - biasing, post-processing tools

Presentations (1)

- Alberto Ribon – anticipated needs of ATLAS, CMS and Calice
 - expect to soon improve agreement in shower shape parameters to $< 10\%$
 - foreseen increase in statistics will likely reveal shortcomings in simulation
 - need to be ready with new and alternative models, further comparisons to test beam data
 - improve QGS model – can potentially reach higher energies than FTF
 - D, B meson, tau interactions with nuclei
 - improved K, Y, pbar interactions
 - R-hadrons, Q-balls?

Presentations (2)

- Brycen Wendt – a new fission fragment generator
 - originally developed for use in NIFFTE TPC (for nuclear data measurements)
 - adapted for use with Geant4 NeutronHP
 - uses existing data in G4NDL
 - generates
 - fission fragments and their angular distributions
 - neutrons
 - fission gammas
 - angular distributions for gammas and light ions
 - can be used not only for NeutronHP but also for photo-fission, radioactive decay

Presentations (3)

- Tatsumi Koi – separating NeutronHP from the hadronic framework
 - NeutronHP unique in its need for material arguments
 - adds a lot of overhead to hadronic framework not needed by other hadronic codes
 - NeutronHP requires overhead to comply with framework
 - spirited discussion focused on
 - what would be lost in not deriving from G4HadronicProcess
 - what is better from OO viewpoint
 - issue is thus far unresolved (at least not for 10.0)

Discussions

- Nuclear physics group
 - needs of nuclear physics community not being met
 - we try, but resources in most cases do not exist
 - proposed to increase our outreach to this field
 - Alex Howard – U.K. meeting of Geant4 users in nuclear physics had 53 attendees
 - Daniel Cano – will supply list of NP groups to contact
 - future Geant4 hadronic group meeting to discuss options, support
 - future NP workshop, NP group?
- Neutrino interactions
 - would be nice, but so far no strong requests
 - needed for low background, high intensity experiments
 - options: interface to GENIE, write native code