LPCC Detector Simulation Workshop preparation

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Introduction

- Second LPCC Detector Simulation Workshop planned for 18-19 March 2014

- Indico web page ready:

  - https://indico.cern.ch/conferenceDisplay.py?ovw=True&confId=279530

- Goal of this meeting: to discuss the format and to draft the agenda

Past event

- First LPCC Detector Simulation workshop took place 6-7 October 2011 (more than 2 year ago)
  - indico: http://indico.cern.ch/conferenceDisplay.py?confId=144956
- let's try to look at the past experience and see if there is anything to improve:
  - two (very) full days
    - not that much room for discussions
  - day one: Physics issues
  - day two: Technical issues and developers outlook and feedback

- Physics issues
  - quite some mixture of different topics
  - question: what can the experiments have available by March 2014?
  - should we try to ask specifically for some particular validation?
    - shower shape, multiple scattering, etc
  - or should we just keep the same format as in 2011?

08:30 - 18:30

Physics issues

Goals:
a- Review what was learned from the comparison of collisions' data and simulations: what worked, what didn't work and got fixed (how), and what still needs to be improved
b- Identify benchmarks for the needed improvements, motivated by specific physics performance goals

09:00 **Introduction** *10'*

09:10 **ATLAS: Data and MC comparisons for inner detector tracking and vertexing** *25'*
Speaker: Markus Juengst (Universitaet Bonn)
Material: **Slides**

09:35 **CMS: Models and approximations used in full simulation** *30'*
Speaker: Sunanda Banerjee (Saha Institute of Nuclear Physics (IN))
Material: **Slides**

10:05 **ALICE: Geant4 validation** *30'*
Speaker: Eva Sicking (Westfaelische Wilhelms-Universitaet Muenster (DE))
Material: **Slides**

10:35 **Discussion** *15'*

10:50 **Coffee break** *30'*

11:20 **LHCb: Multiple scattering and EM physics** *25'*
Speaker: Matthew Michael Reid (University of Warwick (GB))
Material: **Slides**

11:45 **ATLAS: Data and MC comparisons for EM calorimeter, electrons and photons** *25'*
Speaker: Olivier Arnaez (Johannes-Gutenberg-Universitaet Mainz (DE))
Material: **Transparents**

12:10 **CMS: validation results for calorimeters** *30'*
Speakers: Sunanda Banerjee (Saha Institute of Nuclear Physics (IN)), Sunanda Banerjee (Fermilab)
Material: **Slides**

12:40 **Discussion** *20'*

13:00 **Lunch break** *1h0'*

14:00 **ATLAS: Data and MC comparisons for hadronic calorimeters, jets and ETmiss** *25'*
Speakers: Zachary Louis Marshall (Conseil Europeen Recherche Nucl. (CERN)), Zachary Louis Marshall (CERN)
Material: **Slides**

14:25 **LHCb: Hadronic interactions issues** *20'*
Speaker: Nigel Watson (University of Birmingham (GB))
Material: **Slides**

14:45 **ALICE: Transport of low momentum hadrons** *30'*
Speaker: Marco Van Leeuwen (University of Utrecht (NL))
Material: **Slides**

15:15 **Discussion** *15'*

15:30 **Coffee break** *30'*

16:00 **CMS: validation results for tracking detectors** *30'*
Speakers: Mike Hildreth (University of Notre Dame (US)), Mike Hildreth (Department of Physics-College of Science-University of Notre Da)
Material: **Slides**

16:30 **ATLAS: Data and MC comparisons for muon spectrometer, including cavern background** *25'*
Speaker: Laura Jeanty (Harvard University (US))
Material: **Slides**

16:55 **LHCb: Simulation of RICHes** *25'*
Speaker: Sajan Easo (STFC - Science & Technology Facilities Council (GB))
Material: **Slides**

17:20 **Discussion** *25'*

- Technical issues
  - Do we want to review the same issues again, or we are more interested in other things?
- Developers' outlook
  - any particular topic, or standard review of Geant4?

08:00 - 14:00 **Technical issues**

Review requirements by the experiments for improvements on the technical side: CPU performance, architectural issues, fa simulations, handling of pileup, etc..

09:00 **LHCb: Geant4 in the LHCb simulation application** *30'*
Speaker: Gloria Corti (CERN)
Material: Slides

09:30 **ALICE: Geant4 integration** *30'*
Speaker: Dr. Ivana Hrivnacova (Universite de Paris-Sud 11 (FR))
Material: Slides

10:00 **ATLAS: Fast simulation, current status and plans** *30'*
Speaker: Andreas Salzburger (CERN)
Material: Slides

10:30 **CMS: Fast simulation** *30'*
Speaker: Andrea Giammanco (Universite Catholique de Louvain (BE))
Material: Slides

11:00 **Discussion** *20'*

11:20 **Coffee break** *20'*

11:40 **ATLAS: Overall simulation performance, including pile-up** *30'*
Speaker: John Derek Chapman (University of Cambridge (GB))
Material: Slides

12:10 **CMS: pileup issues** *30'*
Speakers: Mike Hildreth (Department of Physics-College of Science-University of Notre Da), Mike Hildreth (University of Notre Dame (US))
Material: Slides

12:40 **Discussion** *20'*

13:00 **Lunch break** *1h0'*

14:00 - 16:50 **Developers' outlook and feedback**

Goal: review the plans for future developments, also in view of the needs presented by the experiments in Session 2

14:00 **Geant4 kernel: status & perspectives** *30'*
Speaker: Makoto Asai (SLAC National Accelerator Laboratory)
Material: Slides

14:30 **Geant4 physics: status & perspectives** *45'*
Speaker: Dr. Alberto Ribon (CERN)
Material: Slides

15:15 **Discussion** *15'*

15:30 **Coffee break** *20'*

15:50 **Detector Simulation R&D** *30'*
Speaker: Dr. Rene Brun (CERN)
Material: Slides

16:20 **Physics Validation** *30'*
Speaker: Andrea Dotti (CERN)
Material: Slides

16:50 - 18:00 **Final discussion**

Discuss possible ways to monitor progress in this area, and to steer some immediate concrete work. Possible proposals:

- Define a reference version of Geant 4, emergent from the current validation studies with LHC data
- Identify benchmarks for improvements in the simulations, motivated by specific physics performance goals
- Formulate a recommendation to SFT and the experiments for a new mandate for the Geant 4 validation forum
- Propose a format for future meetings of this type:
o hand over to the revamped validation forum?
o decide to iterate the workshop on a yearly basis?
o setup focused WGs on separate issues (physics aspects, technical aspects, ...)
o ...

Summary

- let’s try to decide whether we want to keep the same format as two years ago, or change it somehow
- let’s try to draft the agenda
- each of us will be in charge in organising speakers from his experiment