

## Day 1 (full day), Session 1: Physics aspects

---

### 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

### Format:

- 1 overview talk on constraints on simulation models coming from non-collider data: which experimental measurements constrain the low-energy hadronic physics which are the most uncertain in the models we have in G4 and which therefore affect most the accuracy with which we predict the behaviour of charged and neutral hadrons in our calorimeters? (talk given by someone in the geant developers team)

- presentations from the LHC experiments. Factorize contributions from each experiment into the following topics (not all exp's have to cover all topics):

- i) EM calorimetry
- ii) Had Cal
- iii) Tracking and muons
- iv) Particle ID
- v) Forward physics (including alfa, totem, lhcf)
- vi) Issues emerging from the HI run
- vii) Activation issues (detectors, cavern backgrounds, etc)

## Day 2, morning, Session 2: Technical issues

---

### Goal:

Review requirements by the experiments for improvements on the technical side: CPU performance, architectural issues, ... Possible explicit issues to be covered:

- Fast simulations
- Integration of different physics models (G4, Fluka, etc) in the same framework
- Possible other topics where experiments welcome an exchange of information on the respective approaches. E.g. B-field maps, handling of pile-up in simulations, description of occupancy, etc.
- CPU performance issues (parallelization, GPUs, multicores, ...); may include an assessment of pre-data predictions for the performance of

simulation and reco software

- Needs arising from ongoing and future upgrade studies. This may or may not include possible synergy with needs emerging from LC detector studies (e.g. handling of geometries, etc)

Day 2, afternoon, Session 3: Developers' feedback and outlook

---

Goal: review the plans for future developments, also in view of the needs presented by the experiments in Session 2. It is desirable to have available from the experiments, at least 1 week before the meeting, previews of what will be shown in Session 2, to enable the developers to prepare appropriate feedback

Topics: will be proposed after discussion with the various reps from the developing teams (G4, Fluka, Brun, etc).

Final discussion

---

We may want to 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 ...