Towards Detector & Beamline Simulations Letters of Interest

Krzysztof Genser/Fermilab & Vincent Pascuzzi/LBL

Snowmass Computational Frontier Workshop

CompF2: Theoretical Calculations and Simulation Session

August 10th, 2020

Planned LOIs
All titles are preliminary/guesses and will likely change

- Celeritas, a nascent GPU detector simulation code
  - T. Evans et al.
- Simulating Optical Photons on GPUs with Geant4 and external tools
  - H-J. Wenzel et al.
- Pre-learning Geant4 geometry on GPUs using an ML-based map
  - E. Kourlitis et al.
- Simulation on HPCs
  - Z. Marshall et al.
- Dark matter detector simulation plans/needs
  - TBD (P. Cushman et al)
- Approximate deadline for the above LOI drafts, August 17th

- A summary LOI: Detector & Beamline Simulation needs and possible approaches to address them, including ideas how to speed up simulations
  - K. Genser, V. Pascuzzi et al.
- Approximate deadline for the summary LOI draft, August 24th

Possible background material/references

- 2017 Papers mentioned on the HSF Site: A Roadmap for HEP Software and Computing R&D for the 2020s
  - https://hepsoftwarefoundation.org/organization/cwp.html
- HSF Detector Simulation Working Group
  - https://hepsoftwarefoundation.org/workinggroups/detsim.html
- GeantV: Results from the prototype of concurrent vector particle transport simulation in HEP
  - https://arxiv.org/abs/2005.00949
- Geant4: Task force for R&Ds
  - https://geant4.web.cern.ch/collaboration/task_force_rd
- Celeritas Project https://github.com/celeritas-project
  - https://indico.cern.ch/event/904385/contributions/3818859/attachments/2019713/3376693/presB-celeritas.pdf
- 2020 HL-LHC Computing review paper: Common Tools and Community Software for the LHCC
- HEP CCE: cross-cutting initiative to promote excellence in high performance computing (HPC) including data-intensive applications, scientific simulations, and data movement and storage
  - https://press3.mcs.anl.gov/hepfce/

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Feedback & Participation more than welcome

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(and SNOWMASS-COMPF02-THEORYCALCSIM if not done so already)

if you would like to join the subgroup

or contact us directly

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