

Theoretical Calculations and Simulation Panel Discussion (CF2)

Tuesday, 11 August 2020 12:00 (1h 30m)

Panel Members

Event Generators - Hugh Gallagher, Stephen Mrenna
Accelerator Modelling - Eric Stern
Detector Modelling - Vincent Pascuzzi, Krzysztof Genser
Theory (Lattice) - Andreas Kronfeld
Theory (Perturbative) - Andreas von Manteuffel
Cosmic Simulations - Salman Habib

Moderator Questions

Classical computing:

Q1. For each field, please explain what science do you want to do, and do you expect to be able to achieve your goals with projected computing resources?

Q2. For each field, please estimate the fraction of the computing cycles that use algorithms that are highly parallel, and viable to port to parallel architectures (vector/accelerator etc..).

Q3. Do you currently use HTC, or HPC, or a mix of computing resources? (How) do you expect this to change in future?

Q4. How much human effort is required to support software development or adaptation for new machines? (e.g.

How big is US effort? Is it part of an international effort?

How does this compare and fit in? Size of code?

Number of FTE years to port to acceleration? Languages considerations such as OpenMP offload, SYCL, or CUDA etc..?

Any difficulties? Plan for long-term code user support?)

Q5. Do you need DOE computing lab expert support for (software) RD; funding such as ECP or SciDAC. (e.g. How much? Do you have collaboration with applied math people? Is there any need for advanced numerical methods?)

Q6: What will your requirements for data storage be?

(e.g. Volume? Bandwidth? Distribution? Integrity guarantees? Life cycle? Data sharing?)

Machine Learning

Q1 For each field, do you expect to use machine learning in your main algorithms 10 years from now? What application benefits do you expect from ML in your area?

Q2 Please describe the degree to which you expect to use machine learning in 10 years. What level of certainty do you have?

Q3 Are you able to use commercial ML packages, like TensorFlow, Baidu, Theano, Torch, or do you need custom software? Do you need a programme of education in ML methods?

Quantum Computing

Q1 For each area, do you expect to engage with the development of quantum computing as scientific activity?

Q2 For each area, do you expect quantum computers to help solve your computational problems in the next 10 years? 20 years? Are quantum algorithms understood?

Q3 Is there activity or engagement with quantum algorithm programming?

Session Classification: CompF2: Theoretical Calculations and Simulation