Computing working group

High performance computing (HPC) session

13:30 Gaute Hagen – intro – 5min
13:35 Calvin Johnson (in person) – 15 min
13:50 Pieter Maris (in person) – 15 min
14:05 Ken Roche (virtual) – 15 min
14:20 Michael Zingale (virtual) – 15 min
14:35 Christopher Crawford – 5 min
14:40 Discussion 20 min
15:00 End of HPC part





Scientific discovery in the exa-scale computing era

SciDAC DOE: Collaborations between applied mathematicians, computer scientists, and nuclear physicists lead to efficient utilization of leadership-class computing resources and pushes the frontiers in nuclear astrophysics and ab-initio low-energy nuclear structure

²⁰⁸Pb 2022

26

¹³²Sn 2020

20

82





Innovative and Novel Computational Impact on Theory and Experiment (INCITE) program http://www.doeleadershipcomputing.org/



http://www.alcf.anl.gov/

https://www.olcf.ornl.gov/

INCITE awards 2022

Ab-initio nuclear structure and nuclear reactions

Summit: 690,000 node hoursFrontier: 900,000 node hoursTheta: 2.5M node hours

Long term 3D simulations of core-collapse supernovae Summit: 700,000 node hours

https://www.doeleadershipcomputing.org/awardees/



INCITE Allocation Trends 2008 – 2021



Resolution 3 (draft)

We recommend investments in computational nuclear physics to accelerate discoveries and maintain U.S. leadership by:

- Strengthening programs and partnerships to ensure the efficient utilization of new HPC hardware and new capabilities and approaches offered by AI/ML and quantum computing (QC);
- Establishing programs that support the education and training of a diverse and multidisciplinary workforce with cross-disciplinary collaborations in HPC, AI/ML, and QC;
- Expanding access to dedicated hardware and resources for HPC and new emerging computational technologies.

Quantum Information Science for US Nuclear Physics Long Range Planning – 2022

Organizing Committee: Douglas Beck (UIUC), Joe Carlson (LANL), Zohreh Davoudi (U of Maryland), Joe Formaggio (MIT), Sofia Quaglioni (LLNL), Martin Savage (UW)

This meeting will gather experts to consider the current state of quantum information science in nuclear physics research. It is expected to provide information to be considered during the current nuclear physics long-range planning process.

This workshop is jointly-sponsored by Los Alamos National Laboratory (LANL) and the InQubator for Quantum Simulation (IQuS), and will be held in the Hilton Hotel in Santa Fe. The New Mexico Consortium (NMC) has kindly agreed to handle the logistics.

To register for this event : **REGISTRATION**



https://iqus.uw.edu/events/quantum-information-science-for-nuclear-physics-long-range-planning-2022/

Questions for discussion

- What is the progress since the 2015 LRP?
- What are the scientific challenges?
- What are the scientific opportunities?
- What are the resources needed?
- What international coordination and collaborations are possible?
- What interagency coordination and collaboration would be useful?
- What synergies and opportunities are possible with neighboring research disciplines?

What are the most compelling scientific opportunities over the next decade & their potential scientific impact?

- This is the most important part
- Please, remember that our job is to identify compelling science opportunities, articulate what makes them compelling, what is needed to maintain leadership
- It is **not our job** to prescribe/micromanage solutions by the DOE and NSF.

