Ab-Initio Structure

- Lattice Results for Nuclear Structure (Luu)
- QMC Calculations of Nuclei and Neutron Drops (Wiringa)

- Large-Scale Shell Model Calculations (Maris)
- Math/CS Issues Related to the Shell Model (Yang)
- Ab Initio Coupled Cluster Calculations of Nuclei (Papenbrock)

Afternoon

- QMC Calculations of Nuclear Overlaps (Brida)
- Calculations in External Fields (Carlson/Vary/Furnstahl)

Important Issues

Status of Deliverables for this FY
Plans for next FY
How does your work fit into overall UNEDF plans?
How does this fit into co-design ideas?

http://www.sc.doe.gov/grants/LAB10_07.html

Computational Issues that must be addressed

- 1. Clock frequencies are expected to decrease to conserve power; as a result, the number of processing units on a single chip will have to increase;
- 2. The energy costs of moving data both on-chip and off-chip will become much more important;

3. Total concurrency in the applications must rise by a factor of ~1 million;

4. Although the memory per flop may be acceptable, memory per processor will fall dramatically which will make current weak scaling approaches problematic;

5. For both power and performance reasons, locality of data and computation is much more important so flat cache hierarchies will no longer be helpful;

6. The failure rates for components and manufacturing variability make it unreasonable to assume the computer is deterministic. This is true for performance today and will affect the results of computations by 2018 due to silent errors.

7. Synchronization will be very expensive and the work required to manage synchronization will be high.

8. The I/O system at all levels – chip to memory, memory to I/O node, I/O node to disk— will be much harder to manage due to the relative speeds of the components.

co-design (continued)

Q: Are partnerships with universities or industry allowed?
A: It is up to the laboratories to assemble appropriate teams in order to address the research challenges outlined in the solicitation. If university or industry partnerships are desired, such partnerships are to be effected through the award of subcontracts, existing consulting agreements, CRADAs, or any other existing mechanism – but we cannot accept separate applications from university or industry for this call.
Q: What kind of interactions may I have with vendors?
A: Proposers may propose any interactions with vendors that advance the goals of their proposals. All vendor interactions will require corresponding letters of support from the vendors.
Q: The call says there is $8M available in FY10 but requests proposals for $5 to $10M. Are you anticipating outyear increases?
A: Yes.
Q: Are there any companion calls?
A: No.
Q: Is there an advantage to addressing several applications?
A: No. The FOA specifically asks for one overreaching application for each co-design center.

DNP Fall 2010
Nov 2-6, 2010
Santa Fe, NM

Last day for abstracts July 1 !

www.lanl.gov/dnp

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