

## OPPORTUNITIES FOR TIER-2 COMPUTING AT ARGONNE



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# **COMPUTING AT ARGONNE**

Two world-class computing facilities



# (ALCF)



- Part of DOE Leadership Computing Facility (together with Oak Ridge)
- Key player in exascale project
- User facility

- Mid-range supercomputing resources
- Aimed to enable high-performance computing (HPC) across Argonne
- Paid through laboratory overhead



# ALCF COMPUTING RESOURCES

5 clusters: Theta, Mira, Cetus, Vesta and Cooley





- IBM BlueGene/Q architecture
- 49,152 IBM PPC A2 Nodes
- 786,432 cores total
- 10 PetaFlops

- Cray/Intel (prototype for Aurora)
- 4,392 Intel Xeon Phi 7230 Nodes
- 281,088 cores total
- 11.69 PetaFlops





#### AURORA: WORLD'S FIRST EXASCALE COMPUTER

- ALCF 2021 (under construction)
- Order-of-magnitude leap from current generation
- Support for 3 "pillars": simulation, data and learning



# LCRC COMPUTING RESOURCES

#### 2 clusters: Bebop and Blues



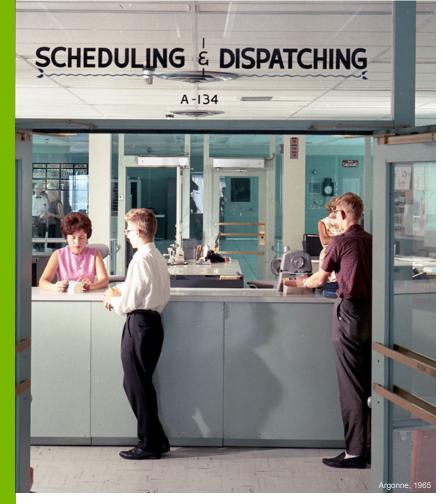
- Traditional cluster (like farm)
- Sandy Bridge & Haswell nodes
- ~7000 cores total
- 110 TeraFlops



- Cray CS400 architecture
- Intel Broadwell & Knight's Landing
- 46,720 cores total
- 1,000 TeraFlops (1 PetaFlops)







# LCRC WORKFLOW

#### Job scheduling and dispatching

- SLURM on Bebop
  - same as new JLab batch system!
- PBS on Blues

#### Infrastructure

- Fast data transfer through GLOBUS
- Large scale data storage possible
- Possible to buy additional "private" cluster nodes for Bebop
  - Maintenance included in Argonne overhead!



# **OPPORTUNITY**

A dedicated tier-2 system for CLAS12 (SIDIS, ALERT, ...) as a service?





- Proposal for a dedicated tier-2 system
  - Store significant part of raw data at Argonne (minimizing data transfer bottlenecks)
  - Use Bebop (PetaFlops cluster!) to run reconstruction jobs
  - Can also use system for large-scale simulation jobs
  - Tie everything together with GLOBUS (similar to OSG)
- Leverage the considerable computing resources our group already pays for!







#### WHITE PAPER

## **MOVING FORWARD?**

- Start with existing resource allocation, can hit the ground running.
- White paper for official large-scale LCRC project
  - Enables us to obtain additional resources
- ... only with your endorsement!

# WE CAN OFFER CONSIDERABLE COMPUTING RESOURCES FOR RECONSTRUCTION/SIMULATION AT ARGONNE ...

# ... WITH YOUR ENDORSEMENT.



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