

USQCD Facility Review 2014

USQCD Allocation Process

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Functions of the Executive Committee

- Write major proposals for the collaboration
 - SciDAC [now split into HEP and NP]
 - USQCD Facilities proposal
 - Requesting time on Leadership resources:
 - DOE/INCITE
 - NSF/Blue-Waters
- Organized community in writing of White-Papers which have defined scientific goals of USQCD

Scientific Program Committee

The Scientific Program Committee (SPC) advises the Executive Committee (EC)

- The SPC advises the EC on science priorities for USQCD
- The SPC recommends projects for leadership resources
- The SPC suggests to the EC allocations of computer time on the USQCD facilities (FNAL+JLab+BNL) as well as leadership resources

Membership

- SPC: currently, 7 members
 - Serve about 3 to 4 years
 - Rotate about 1 or 2 each year
- 2014: W. Detmold, [R. Edwards](#), A. Hasenfratz, T. Izubuchi, P. Petreczky, D. Toussaint, R. Van de Water
- 2013: S. Catterall, W. Detmold, [R. Edwards](#), T. Izubuchi, P. Petreczky, D. Toussaint, R. Van de Water
- 2012: S. Catterall, [R. Edwards](#), T. Izubuchi, P. Petreczky, M. Savage, D. Toussaint, R. Van de Water
- 2011: S. Catterall, R. Edwards, T. Izubuchi, [F. Karsch](#), M. Savage, J. Shigemitsu, D. Toussaint
- 2010: T. Blum , S. Catterall, C. Dawson, R. Edwards, [F. Karsch](#), M. Savage, J. Shigemitsu
- Previous chairs: [Andreas Kronfeld](#), [Claudio Rebbi](#)
- USQCD:
 - Total of 21 people have served on the SPC
 - Total of 30 people have served on the SPC and/or EC
 - Total of 163 members in USQCD

Allocation process

Process driven by the scientific goals of USQCD

- The SPC determines the available resources for the upcoming year
- We define the guidelines for the proposal Types [A,B,C]
- After approval from the EC, the SPC issues the Call-for-Proposals
- The SPC collects and reviews the proposals. Further information is often requested from the proposers.
- After deliberation, the SPC arrives at an allocation through an internal vote
- Recommendations for allocation are submitted to the EC for approval. The facility managers are also consulted
- The SPC notifies the PI-s and gives a report
- Will address these steps in more detail later

Allocation process, cont.

- The Call-For-Proposals & White Papers outline the scientific goals of USQCD
- Members of the collaboration submit proposals to the SPC requesting resources for scientific computations, and address how they will achieve the goals of USQCD
- While the SPC has suggested calculations that are of importance, it has not issued top-down requests – not perceived as required at this stage, but could do so later
- Rather, the SPC evaluates the proposals and recommends allocations based on the proposal's technical and scientific merit, and the relevance and importance to meet the scientific goals of USQCD

Scientific Priorities

- USQCD White Papers list (not exclusively) priorities – evolved over time
- At formation of USQCD – flavor physics, thermo, & hadron structure
- New proposals have added to program, including
 - 2006: Nuclear interactions (Jlab & NP)
 - 2006: Excited state spectroscopy and radiative transitions (Jlab & NP)
 - First INCITE project (ORNL)
 - 2006: Technicolor/BSM (FNAL, LHC & Energy frontier)
 - 2007: g-2 (BNL, FNAL & Intensity Frontier)
 - 2011: Charge fluctuations (BNL & Thermodynamics)
- New projects responding to expt. or in anticipation of new ones
- Members of these projects have served on SPC & EC
- New white papers written by community
- Allocation process & scientific goals of USQCD go hand-in-hand

Science Advisory Board

- This year, SAB reviewed USQCD science goals
 - Comments mostly helpful in giving perspective from outside the field
 - Generally approved and supported program
- SAB reviewed proposals
 - Some feedback
 - Process helps educate board members (and public), thus a good thing to continue

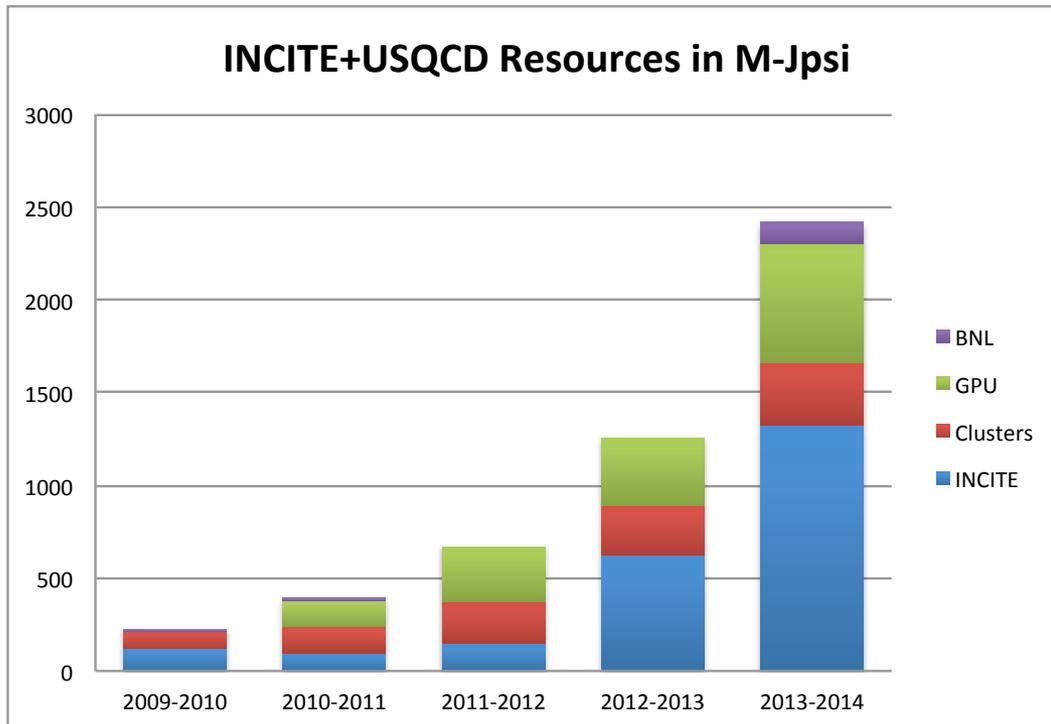
All-Hands Meeting

Important SPC function is organizing the annual All-Hands Meeting of USQCD

- Gather reports from the Project manager, EC, and the Facility managers
- Historically, all the PI-s for Type A and B proposals made presentations
- In last three years the SPC has changed the focus of the meeting to determining the goals of the collaboration. Only a few PI-s are invited to give presentations.

Available resources

- Different machines & capabilities
- Normalize - historically use average performance from inverters
- Tape and disk requirements growing – gone from 5% to 8% facility budget



1 Jpsi = 1.2 GF

Large fraction of resources from GPUs

Significant boost from INCITE

- 2013 ANL/Q - reg: 410M zero: 730M

3 PF sustained for QCD

Proposal classifications

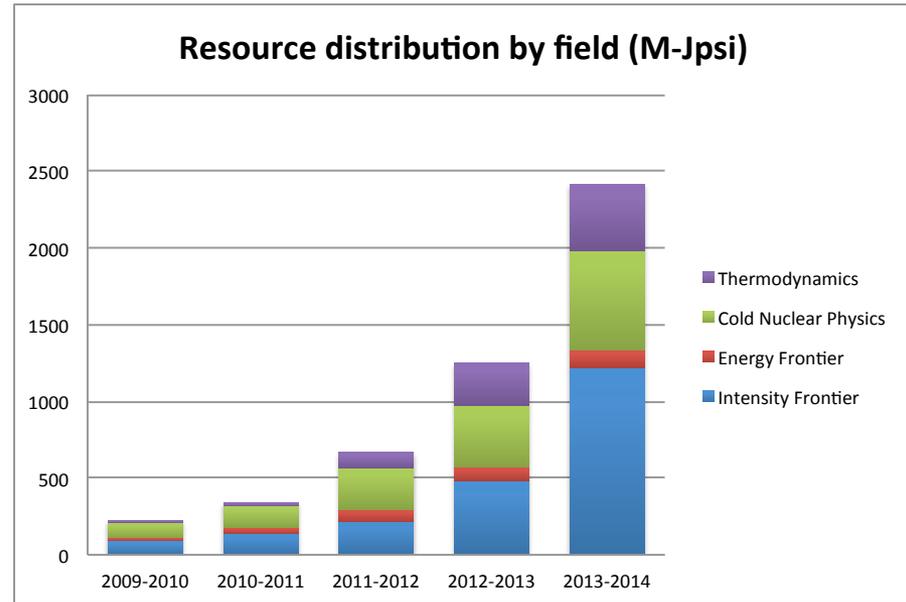
- Types of proposals:
 - A: [$> 2.5M$] benefit to all of USQCD and/or addressing critical needs of USQCD
 - B: [$< 2.5M$] support calculations in early stage - potential to address needs of USQCD
 - C: [100K] exploratory calculations and/or benchmarking
- Comments:
 - Type A proposals often justified by producing gauge fields used for other proposals
 - Students/postdocs encouraged to submit Type B proposals
 - Type C can be requested from Facility managers at any time
- Want vibrant Type B proposal mix – encourage development
 - A target has been 10 – 15% allocation in type-B
 - Type B can be requested ANY time of year – goal is rapid deployment

Proposals

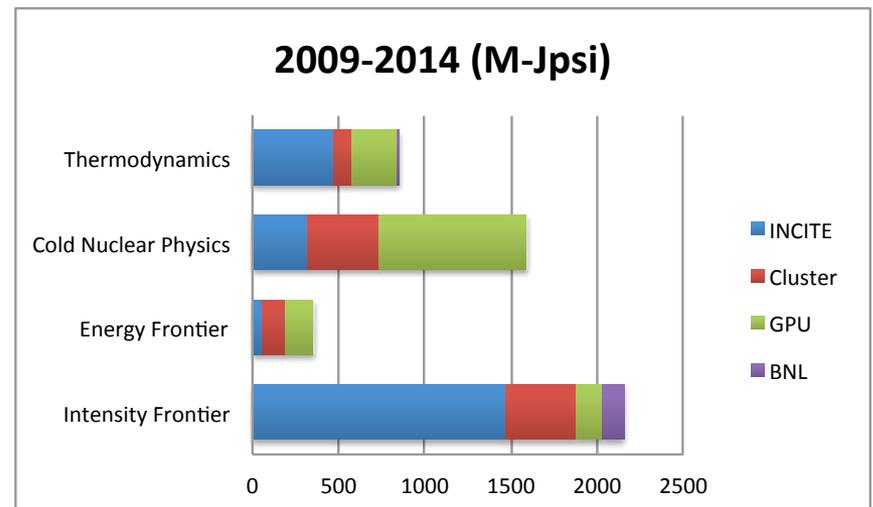
- Counts:
 - 2009: 19 type-A; 9 type-B proposals
 - 2010: 22 type-A; 12 type-B proposals
 - 2011: 22 type-A; 15 type-B proposals
 - 2012: 24 type-A; 11 type-B proposals
 - 2013: 27 type-A; currently 2 type-B (switched to new system)
 - 2014: 27 type-A; currently 5 type-B
- Trends:
 - Resources typically 1.3x to 1.7x oversubscribed
 - Many type-B projects have matured and graduated to type-A [good]
 - Several type-B projects have merged into type-A
 - Presently, type-B amount to 6% of allocated hours
 - To encourage more type-B proposals, have switched to new system [available year-round]
- Comment:
 - Most proposals use SciDAC codes at the base. Many proposals adding higher level functionality needed for that project

Resource distribution by field

- Similar resource distribution for HEP & NP
- Thermo has climbed in %
- Energy frontier < 10%



- HEP: large fraction from INCITE
- NP: large fraction from GPUs



Future

- Allocations
 - Continually reassess scientific priorities in light of available resources
- SPC feedback to facilities:
 - Continual need to understand effectiveness of resources for delivering science
 - Demand (over-subscription) for resources is guiding purchases
- Science evolution:
 - Proposal driven process – moved USQCD in new science directions
 - Proposal process adapting: encouraging new projects

Backup

How does SPC avoid COI

- All proposals clearly indicate co-PI-s.
- During SPC discussions, any SPC members that are co-PI-s of a specific proposal are not allowed to participate in discussions of that proposal.
- Votes (actual allocation) are taken from each member.
- During voting of allocations, an unbiased average of non-participating members is taken. This average is compared to a straight average from all SPC members. Discrepancies are reconciled among the committee. Votes/allocations may be recast.
- Final allocation usually based on unbiased average (although little difference from straight average by design of process)
- Anecdotal remark: have never observed significant discrepancy.

What criterion is used to decide full funding for proposals

- Proposals are classified according to the criterion they are to be evaluated: Type A or B.
- Type A: address critical needs of USQCD
 - Large requests we would expect from only long term, mature, well established projects. New projects requesting large amounts of time will receive very significant scrutiny and probably will not receive a large allocation
 - Large proposals are scrutinized significantly to ascertain whether they do address/achieve the goals of USQCD. Does the project have an established track record? Is the project sufficiently prepared to start the new set of calculations? Are publications coming out? What has been the scientific impact?
 - Ultimately, only a fixed amount of time is available. Long term projects requiring more than the available time will not fair well
- Type B: development
 - Upper bound to time (2.5M): threshold much lower. If a reasonable case is made, then full funding is very likely
 - Projects seeking a renewal are scrutinized to determine if progress is being made along with the potential for growth to type A

What feedback is given to PI-s after allocation

- Resources almost invariably over-subscribed
- This is the type of response for strong proposals:
 - *The study of light pseudoscalar physics, especially the $K \rightarrow \pi\pi$ decay, is important to the goals of the USQCD collaboration. Also, the SPC recognizes that this work, including the scale setting from the Omega mass and the quark mass tunings, is an essential part of your collaboration's physics program. However, the total resources needed by all of the important projects was considerably larger than the available resources, and we therefore cannot grant all of your request. The allocation listed above is the amount available for your project while balancing the needs of the entire collaboration.*
- Based upon complaints received by the SPC that not enough feedback was given to PI-s, the SPC now writes more extensive reports to the PI-s.
- Encouragement for future calculations were suggested: i.e.,
 - *As noted in our earlier comments, the SPC is very interested in seeing the $\Delta I = 1/2$ $K \rightarrow \pi\pi$ calculation move forward, although that is not part of the work proposed here.*
 - The SPC received a proposal for this work the next year
- We emphasize that significant critical (but constructive) criticism was given to several proposals (but not displayed here)