Lattice QCD Extension II Computing Project
(LQCD-ext II)

Response to Recommendations and Suggestions from the 2018 DOE Annual Progress Review of the LQCD-ext II Computing Project

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LQCD-ext II 2018 Annual Progress Review

Response to Review Recommendations

INTRODUCTION

The Annual Progress Review of the LQCD-ext II (Lattice Quantum Chromodynamics extension II) project was held on May 21-22, 2018, at the Brookhaven National Laboratory (BNL). The purpose of the review was to assess LQCD-ext II's progress towards their overall scientific and technical goals, and to assess the role of the USQCD collaboration in governing the usage of the projects hardware. In particular, the LQCD-ext II team was instructed to address five charges:

1. The continued significance and relevance of the LQCD-ext II project, with an emphasis on its impact on the experimental programs supported by the DOE Offices of High Energy (HEP) and Nuclear Physics (NP)
2. The progress towards scientific and technical milestones are presented in the LQCD-ext II's Project Execution Plan
3. The status of the technical design and proposed technical scope for FY 2018-2019 for the project
4. The feasibility and completeness of the proposed budget and schedule for the project
5. The effectiveness with which the LQCD-ext II project has addressed the recommendations from last year's review

The USQCD collaboration addressed the charge:

6. The effectiveness of USQCD in allocating the LQCD-ext II resources to its community of lattice theorists, the scientific impact of this research on the entire HEP and NP communities and the status, operational procedures and related activities of the USQCD collaboration itself.

RESPONSE TO SUGGESTIONS (Computing Project Team & Scientific Suggestions)

Suggestion #1: Each of the reviewers recommended that the remaining HEP FY2018 project funds ($0.85m) be released as soon as possible in light of the very positive impressions made at the review.

Report Section: Executive Summary, Progress towards Scientific and Technical Milestones

Response: Following the review, the Office of High Energy Physics (HEP) released the remaining $0.85m of FY18 funds to Fermilab, the site of the next planned acquisition. All remaining funds were received at Fermilab by the end of July 2018.

Suggestion #2: The project should work with Fermilab to initiate the development of a program of Institutional Clusters.

Report Section: Executive Summary, Technical Design and Scope for FY2018/19

Response: We agree with this suggestion. The LQCD Project and Fermilab are collaborating on the design, procurement and installation of a high-performance computing cluster that will 1) meet the

computing needs of LQCD and the Fermilab scientific community; and 2) be operated as an institutional cluster. A joint Acquisition Planning Committee was formed with members chosen based on their technical expertise and knowledge of USQCD needs, Fermilab experimental program needs, or both. The committee chairperson was Amitoj Singh, an FNAL employee and the FNAL Site Manager for the LQCD Project. The purpose of the committee was to understand users' needs, existing computing resources, make a recommendation on the design and specifications for a new institutional compute cluster at Fermilab. All requirements were documented within the FY19 Joint Acquisition Evaluation Committee Report, which was issued on September 12, 2018.

Using information from the committee's report, the LQCD Project Alternatives Analysis (AA) document, with 5 viable options and one recommendation, was completed by Amitoj Singh on September 19, 2018. The AA document was presented to the LQCD-ext II Contract Project Manager for review and approval. Copies of both documents were subsequently sent to Andreas Kronfeld, Chair of the USQCD Executive Committee, for review and comment by the committee, and to Liz Sexton-Kennedy, Fermilab CIO, for review and comment by Fermilab management. The LQCD Project and Fermilab are continuing to work collaboratively on the preparation of procurement documents.

Suggestion #3: The project should develop procedures to document scientific milestones uniformly over all the LQCD areas so that the project can track their annual progress quantitatively and present it more thoroughly at each review.

Report Section: Executive Summary, Progress towards Scientific and Technical Milestones

Response: We agree with this suggestion and have developed a plan to address it. As discussed at the Review, USQCD has commissioned six whitepapers on the full range of physics topics, and a seventh on computing accomplishments and challenges. We have organized the writing in such a way to bring in enough authors to represent all our scientific goals. The whitepaper coordinators are attentive to the need to match physics relevance and computing feasibility into a set of reviewable milestones.

At the same time, we should not formulate milestones in a way that stifles innovation or sets artificial end dates. An example of the latter is precision: just as with precision experiments, a certain target on a five-year time scale does not necessarily render irrelevant a more precise result on a ten-year time scale.

Suggestion #4: Given the direct relevance of lattice gauge calculations to the experimental community, it would be valuable to enlist experimental physicists to advocate for the project during future reviews and in the next multi-year extension proposal due in 2019.

Report Section: Executive Summary; USQCD Plans Beyond FY2019

Response: We agree with this suggestion. Historically, both experimentalists and phenomenologists (who see how lattice QCD aids interpretation of experiments) have joined the USQCD Scientific Advisory Board quite eagerly. Many of them have proven that they could be very useful to USQCD and DOE in this way, and we plan to draw on them for this purpose.

Suggestion #5: The project team should formulate a written plan to address the decreasing satisfaction articulated in the Compute Facility Satisfaction user survey results and present it to the DOE within two months.

Report Section: Executive Summary; Effectiveness of USQCD, Scientific Impact, Procedures and Related Activities

Response: *We agree with this suggestion. The Associate Contractor Project Manager (ACPM) has documented user survey results and feedback by category, by site. BNL and FNAL have created action plans to address feedback received through the survey. Fermilab has already taken steps to improve user documentation; improvements at BNL are underway. A written plan to address decreasing satisfaction levels will be prepared by the LQCD Project Office. In parallel, JLAB has been asked to create a written plan to address decreasing satisfaction ratings at that host site. The written plans will be shared with DOE as soon as they are finished.*

Suggestion #6: The reviewers recommend that Fermilab carefully examine the BNL institutional cluster model. The reviewers believe that Fermilab would discover that the advantages outweigh the disadvantages. It may even be beneficial for the laboratories to coordinate: do both Labs need to have the exact same mix of Single-CPU, multicore and GPU based computing?

Report Section: Executive Summary, Technical Design and Scope for FY2018/19

Response: *We agree. Fermilab has expressly noted that they intend to follow the BNL model to the extent practical given differences in existing host site infrastructure, support staff, etc. Moreover, through activities such as those described in Suggestion 2 above, the laboratories are coordinating with one another. Procurement options and decisions are factoring in the total mix of available hardware; there is no advantage in having the same mix at the two sites. Rather, hardware decisions are being made based on the needs of the LQCD project and the scientific programs of each laboratory.*