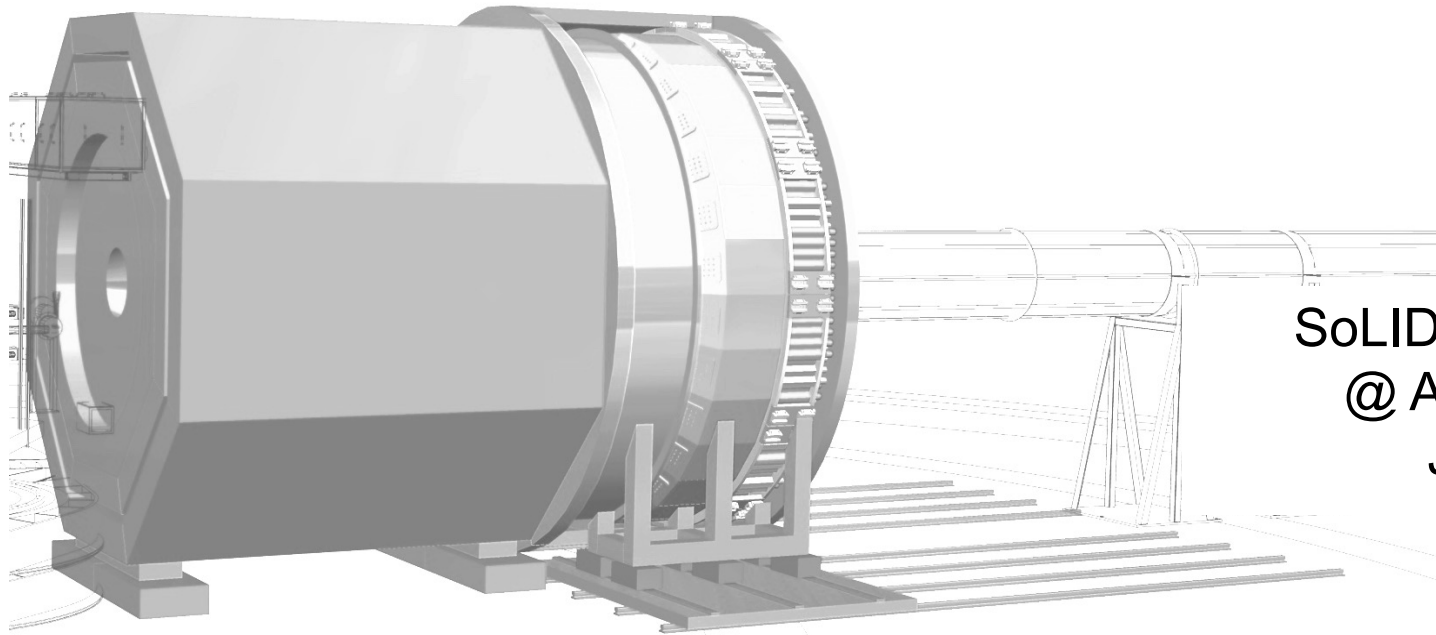


SoLID Update



SoLID Collaboration Meeting
@ Argonne National Lab
June 21-22, 2024

Jian-ping Chen
Jefferson Lab



Outline

1. Progress Since Dec 2023 Collaboration Meeting
2. Recent Development
 - Cost Sharing Plan
 - NSAC Decadal Facility Review
3. Plan for the Next Steps

Progress Since Dec 2023 Collaboration Meeting

- Project Status
 - In consultation with DOE, worked out a new budget plan with JLab cost sharing
 - Presented to DOE at Feb Budget briefing, follow-up discussions
- NSAC Decadal Facility Review
- Pre-R&D Activities:
 - DOE funded 2nd pre-R&D
 - 1. Detector Beam Test in Hall C: wrapping up analysis (Michael Nycz, Ye Tian)
 - 2. DAQ test and plan (Alexandre Camsonne)
 - Discussion with DOE on further pre-R&D
- Progress in All Subsystems
 - Engineering/Design/Magnet (Whit Seay)
 - Software/Tracking (Chao Peng, Weizhi, Xiong, Shujie Li)
 - GEM (Nilanga Liyanage)
 - LGC (Michael Paolone): Mirror Coating Progress (Bill Li)
 - HGC (Zhiwen Zhao): Regina (Garth Huber) funding from Canada approved
 - Ecal/SPD (Richard Trotta)
 - Detector (Ecal/MRPC) R&D from China Side (Dong Liu, Zhihong Ye)
- Physics: Workshop, many interesting new topics
 - run-group proposal: SIDIS cross section

Recent Development I: Cost (Sharing) Plan

- ❖ DOE Discussion with Jlab (last year): Keep cost low (JLab cost sharing)
- ❖ SoLID Collaboration working with JLab/Physics Division/Hall A on a cost sharing plan
 - Part of Division capital fund for part of DAQ and detectors (GEMs and LGC)
 - Part of Hall A operation fund for magnet testing
 - Total sharing close to 1/3 of the cost.
- ❖ Presented to DOE at February lab budget briefing
 - Follow up discussion, changed starting date from FY25 to FY26 (FY25 budget tight, no new projects starting)
 - Discussion on possible additional pre-R&D to “preemptively” reduce risks

NSAC Decadal Review of Nuclear Physics Facilities

❖ Charge from Director of DOE Office of Science in Dec. 2023

Review two aspects:

- (i) the potential to contribute to world-leading science in the next decade and
- (ii) the readiness for construction.

❖ 8 Projects were chosen to be reviewed (by DOE Office of Nuclear Physics)
including EIC, SoLID and EIC 2nd detector

❖ NSAC Subcommittee Completed Review in short time with report ready in May 2024
Science followed Long-Range Plan
Review focus on readiness
SoLID collaboration was asked to provide input.

NSAC Facilities Review Summary

Scientific importance categories: (a) absolutely central; (b) important; (c) lower priority; (d) don't know enough yet.

Readiness for construction categories: (a) ready to initiate construction; (b) significant scientific/engineering challenges to resolve before initiating construction; (c) mission and technical requirements not yet fully defined.

Project	Scientific Importance	Readiness for Construction
EIC	a	a
HRS	b	a
TS-NLDBD	a	a
Project 8	b	c
FRIB400	b	a
SoLID	b	a
EIC Detector II	b	c

NSAC Decadal Review of Nuclear Physics Facilities

The importance of the science for each project as assessed by the Subcommittee was tied closely to the 2023 LRP. Recommendation #1 of the 2023 LRP addresses the need for investment in research and effective operations of the national user facilities. Recommendations #2 and #3 “reaffirm the exceptionally high priority of the following two investments in new capabilities for nuclear physics. The Electron-Ion Collider (EIC), to be built in the United States, will elucidate the origin of visible matter in the universe and significantly advance accelerator technology as the first major new advanced collider to be constructed since the LHC. Neutrinoless double beta decay experiments have the potential to dramatically change our understanding of the physical laws governing the universe.” These two projects have been evaluated by the nuclear science community as absolutely central to maintaining U.S. leadership in the field and answering the key scientific questions of our time. Recommendation #4 encompasses additional projects and new strategic opportunities to advance discovery science. The remaining projects we were asked to evaluate as part of this charge are examples of strategic opportunities to advance discovery science. These additional projects are critically important to the field and to maintaining U.S. leadership in nuclear science. Several of the projects take advantage of previous investments at national user facilities.

NSAC Decadal Review of Nuclear Physics Facilities

In considering the readiness for construction the Subcommittee was guided by the current status of the project and remaining challenges, including the DOE critical decision level, if any. We noted that a large gap exists between rating (a) ready to initiate construction and (b) significant scientific/engineering challenges to resolve before initiating construction. Projects that do not have significant scientific or engineering challenges were given a rating of (a), but in each case we explain the status and any special circumstances affecting readiness.

Plan for the Next Steps

- SoLID Collaboration with Strong Support from JLab, work with DOE/ONP to Move SoLID Forward
 - Be ready when time comes
- Plan and Preparation with JLab resource
 - Magnet testing (Whit Seay)
 - Capital Project I GEM/Tracking (Nilanga Liyanage)
 - Capital Project II LGC (Michael Paolone)
- pre-R&D Activities
 - DAQ and GEM readout (Alexandre Camsonne)
 - Complete analysis of detector beam test data (Mike Nycz)
 - Comparison with simulation, verify/refine the design (Ye Tian)
 - Looking into further pre-R&D
- Other Development
 - Software, synergy with EIC software development (Chao Peng/Weizhi Xiong/Shujie Li)
 - ECal and MRPC (Richard Trotta/Dong Liu/Zhihong Ye)
 - HGC (Zhiwen Zhao)
 - Mirror coating (Bill Li)
 - Stream Readout (David Lawrence)
 -