



Kin Chao, DOE/SC, Chairperson

SC1

Accelerator Physics

- \* David Robin, LBNL
Boris Podobedov, BNL
Fernando Sannibale, LBNL

SC2

Accelerator Systems

- \* Karen White, ORNL
Martin Johansson, SLAC
Jim Sebek, SLAC

SC3

Experimental/Beamline

- \* David Fritz, SLAC
Alex Hexemer, LBNL
Zhong Zhong, BNL

SC4

Front Ends / Insertion Devices

- \* Michael Rowen, SLAC
Matthaeus Leitner, LBNL

SC5

Accelerator Removal / Installation

- \* Richard Boyce, SLAC

SC6

Environment, Safety and Health

- \* Mike Andrews, FNAL

SC7

Cost and Schedule

- \* Wayne Steffey, ORNL
John Post, LLNL

SC8

Project Management

- \* Allison Lung, TJNAF
Steve Meador, DOE/OPA
Howard Wilson, SLAC

Observers

- Harriet Kung, DOE/SC
Jim Murphy, DOE/SC
Ed Stevens, DOE/SC
Peter Lee, DOE/SC
Ron Lutha, DOE/ASO
Frank Gines, DOE/ASO
Mike Fenn, DOE/PM

LEGEND

- SC Subcommittee
\* Chairperson

COUNT: 19 (excluding observers)



## General Consensus:

- Overall the reviewers were very impressed with both the quality of the work and presentations.
- There has been extremely good progress in advancing the understanding of accelerator physics issues and the development of designs for accelerators, insertion devices and beamlines that will ultimately fulfil the goal of realizing the world's brightest hard X-ray storage ring light source and exploiting its capabilities.
- Of course there is much to do in further defining project activities, costs, schedules, policies, ever-evolving science applications, etc., that are needed to ensure the best possible success for this world-leading facility.



## 1. Scope:

- Are the R&D, design, prototyping, and LLP efforts being effectively prioritized, planned, and managed to meet the technical performance requirements and minimize technical risks to the project? **Yes.**
- Are the designs, system specifications and interfaces appropriately defined and sufficiently mature to support the proposed FY 2018 LLPs? **Yes.**
- Has there been sufficient progress to determine if klystrons or solid state amplifiers will serve as the baseline RF power system? **Yes.**

## 2. Cost and Schedule:

- Are the cost and schedule estimates credible and do they include adequate contingency to deliver the defined scope? **Yes.**
- Are the systems and staff correctly tracking and reporting earned value of the LLP scope? **Yes.**
- Does the performance to date on LLPs meet expectations? **Yes.**



### 3. Management:

- Is the project being appropriately managed at this stage? **Yes**
- Is the overall plan including project staffing, management, and procurement systems progressing sufficiently for this stage of the project? **Yes**
- Are project risks being appropriately identified and managed? **Yes**
- Are the LLPs being properly planned and executed? **Yes**

### 4. Environment, Safety & Health and Quality Assurance (ES&H/QA):

- Is ES&H/QA properly addressed at this stage of the project? **Yes**
- Are ES&H/QA requirements and plans adequate to support the planned LLPs? **Yes**

### 5. Recommendations:

- Have the recommendations from previous reviews been appropriately addressed? **Yes (almost in the case of removal and installation)**



## Accelerator Physics

1. Monte Carlo simulations of the vacuum pressure in the arcs showed the presence of two local peaks with pressures in the  $10^{-8}$  Torr range after 1000 Amp hour of conditioning. Such local peaks could represent an issue in terms of ion trapping and consequent instabilities.
  - Analysis and simulations should be carried out to verify that this does not represent an issue. This should be completed by the end of FY18.
2. Longitudinal feedback (LFB) system is required to suppress cavity HOM-driven instabilities at APS-U ring, while high harmonic cavity is needed to increase beam lifetime. Effective operation of LFB in combination with high harmonic cavity at APS-U is not immediately obvious.
  - In collaboration with other labs perform additional R&D, including a proof-of-principle experiments that would allow a better extrapolation for LFB performance at APS-U. This should be done by FY19.



## Accelerator Systems

1. The APS-U project should re-evaluate the resources allocated for the Injector part of the project, particularly with respect to meeting the Booster requirements prior to CD-2.
2. The APS-U organizational structure should include a dedicated slot for RF responsibilities prior to CD-2.

## Experimental Beamlines

1. Complete a bottoms up cost and schedule estimate and have this reviewed prior to CD-2.
2. Continue to evolve the WBS dictionary to clearly define feature beamline and enhancement scope prior to CD-2.

## Front Ends and Insertion Devices

1. The R&D work for the planar SCUs should be accelerated and include demonstration of a full double undulator system before going into full production. Develop a detailed preliminary plan for design and fabrication, including manpower and procurement, by June of 2018.



## Accelerator Removal and Installation

1. Develop space requirements needed for the successful integration of APS-U project components and present to ANL management to define on-site facility use; complete in time for LLP magnet receipt and subsequent measurements.
2. Proceed to establish a responsible position on the project to manage cable plant systems and LOTO in time to report on progress made at the Director's CD-2 review
3. Fulfill recommendation from CD-3b review

(Recommendation from CD-3 review: Continue to develop the 12-month shutdown schedule, and Integrated Assembly schedule, in sufficient detail in P6 to be able to identify critical path in the parallel work processes through commissioning. Complete by the Director's CD-2 review.)

## ES&H

1. Approve the APS-U Hazard Analysis Report and the QA Plan by CD-2.
2. Develop and approve the APS-U Project ISM Plan by CD-2
3. Formalize and document the APS-U design review process by CD-2.



## Cost and Schedule

1. None

## Project Management

1. Conduct a project-wide risk workshop as planned in early 2018 in support of preparations for CD-2.

.