

Photon Factory ISAC 2009 September Meeting

Executive Summary and Closing Remarks

K. Hodgson, Committee Chairperson

September 19, 2009

Final Version

ISAC Committee Members*

– 4th ISAC Meeting – September 18-19, 2009

E. Fontes – Cornell University

H. Fukuyama – Tokyo University of Science

E. Gluskin – Advanced Photon Source

K. Hodgson – Stanford University, Chairperson

I. Lindau – Stanford University

K. Miki – Kyoto University

J. Mizuki – Japan Atomic Energy Agency

T. Ohta – Ritsumeikan University

M. Ree – Pohang Accelerator Laboratory

V. Saile – University of Karlsruhe

*Dr. Ree was absent for September 18-19, 2009 meeting

ISAC Perspective



- The Committee is very pleased about the enormous progress of the PF since the first International Review Committee evaluation of the facility in 2006. PF management is given strong recognition for its leadership.
- The PF-ring has been converted into a state-of-the-art soft X-ray facility, the premier facility in Japan, with powerful undulators, 6 new beamlines and new experimental stations. The hard x-ray program has been upgraded and is very competitive. There is a very impressive and vibrant atmosphere, anchored by a talented and young scientific and technical staff.
- The PF-AR science program has been refocused on research areas where the PF is strong and all beamlines including the experimental stations were reorganized.
- The PF management, together with KEK, has developed a vision for the future of the facility, with a 5 GeV ERL that could be available for research around 2020; R&D efforts are under way and will lead to a compact low-energy ERL as a prototype and test-bed.

ISAC Perspective - II

- Most recently, another visionary idea has evolved at KEK; namely, using Super-KEK-B as a synchrotron radiation facility providing super-high brightness beams ranging from soft X-rays to hard X-rays.
- The PF management and scientists deserve much credit for creating an environment where such fascinating new ideas are generated. Furthermore, the merger of the machine physics group with the KEK accelerator division has greatly improved the integration of PF in the KEK laboratory.
- ISAC sees the KEK strategy together with that at SPring-8 as providing world leading capabilities over the coming decade and beyond that will serve the needs of Japan's synchrotron radiation user community.

Question 1 – Has the merger between the Light Source Division with the KEK Accelerator Laboratory been beneficial for the current and future projects?

- There is an obvious, extremely positive and constructive new level of involvement of top KEK Accelerator Laboratory management in the long- and short-term needs of synchrotron accelerator technology and operations.
- This involvement assures not only the appropriate level of the operation performance but helps drive a joint “winning strategy” for the high energy physics and photon science programs at KEK in the medium to longer term.
- New appointments of active and highly-qualified managers for 7th Division are timely and well-balanced. This new generation of young scientists will provide leadership well into the future.

Question 2 – In light of the SPring-8 upgrade scheduled in 2019, is the cERL/KEK-X/ERL scenario reasonable?

- ISAC recognizes the opportunities resulting from a KEK-wide accelerator strategy for providing a long term plan that will deliver world-leading capabilities for high energy physics and synchrotron science over the coming decade and beyond.
- The two organizations (RIKEN and KEK) share a responsibility for planning an optimal strategy to serve the Japanese synchrotron radiation community with the most advanced facilities.
- The cERL/KEK-X/ERL strategy is very interesting and has significant potential. ISAC strongly encourages further development of this approach. It is in an early phase. ISAC suggests that the upcoming Accelerator Subcommittee meeting will be an opportunity to discuss the evolving concept.
- Among the intriguing ideas is the possible use of KEK-X as a future platform to deliver ERL quality beams.
- ISAC believes that it is very important to examine and develop the scientific case and technical feasibility for KEK-X as an ultra high brightness light source.

Question 3 – Do we need a new strategy for beamtime allocation for improving the competitiveness of PF and PF-AR?

- The proposal acceptance rate overall seems too high.
- ISAC does not see that a completely new strategy is needed. However, we feel that clear metrics need to be established and used to improve competitiveness (such as a more critical assessment of publication rates and other productivity factors) that are considered in renewal proposals.
- The best qualified proposals should be supported by more beam time and those investigators should be encouraged to ask realistic levels of beam time to accomplish the scientific objectives.
- ISAC would be willing to give more consideration to this matter if additional information (e.g. on a per beam line basis) was provided.

Question 4 - Is the progress of the compact ERL, in the particular electron gun project, development satisfactory?

- The progress of R&D for the compact ERL is quite strong in all areas of the design and prototyping. Several critical components have been successfully tested.
- The most challenging part of the project – the DC gun – requires further advancements and the team recognizes and concentrates their efforts on this. Notable is the progress with the integrated teams and building the test facility on the PF-AR floor.
- Since XFEL was noted as a major option for the future 5 GeV ERL which could provide significantly enhanced capabilities, it would be beneficial for the project team to analyze this combination in more technical detail and present it to the ISAC Accelerator Subcommittee in February.
- The significant supplemental funding is a positive step in accelerating the project. ISAC notes that it is time to plan more proactively over the coming year for possible forefront applications.

Question 5 - Are the efforts on developing 5 GeV-class-ERL science case pointing to the right directions?

- ISAC is very impressed and pleased with the process that has started including the “brainstorming meetings”.
- The participation of the ERL promotion office at KEK within the context of the international venue is very positive. Hosting the next international ERL meeting is a very positive development.
- ISAC stresses that the unique features of the new sources including, coherence and short pulses, should be coupled to science in the Institutes (including CMRC and the SBRC).
- The CDR, including a scientific case, is proposed for delivery by the end of the fiscal year and ISAC looks forward to receiving it.

Question 6 – Are the overall strategy and progress of the beam line refurbishment program (BL1A, BL13A, NE1, NE3, & NE7 in this period) still valid and sufficiently efficient?

- ISAC observes that the 6 new beam lines at the PF ring have impressive performance and add significant new capabilities for the soft and hard x-ray scientific community in Japan.
- The new short period, small-gap in vacuum undulator installation and commissioning on BL1 has gone remarkably well and shows very great promise for added new hard x-ray capabilities.
- ISAC would value continuing to receive updates on the decommissioning plan that will result in increasing the ratio of staff scientists to beam lines. We recognize progress in this direction but suggest that definite goals and timeline be established and that this program continue to be aggressively pursued.

Question 7 – Are the new schemes proposed for user-operated and education-oriented beam lines reasonable?

- ISAC was pleased to hear of the initial phase of implementation of this new scheme since its last meeting.
- Important issues have not yet been settled, including clear metrics for both user and education-oriented beam lines. This should be done as soon as possible so as to establish expectations for all parties.
- Means may be found to systematically gather feedback and disseminate information to the communities so as to further improve the effectiveness of this approach.
- ISAC notes that education is important element of PF portfolio. It would be valuable to establish measures of such use and success and track them.

Question 8 – How is the progress in establishing the Condensed Matter Research Center? Is it focused enough, the selection of the fields appropriate, and team arrangements?

- ISAC congratulates IMSS on the successful formation of the CMRC under the visionary leadership Prof. Murakami and the senior management at KEK.
- Looking at the existing staff members, formation of the 4 groups with 5 projects is very natural. Identification of the scientific targets in each area is crucial and well done. It is important to further develop cross-cutting aspects of the research portfolio so as to optimize the discovery potential.
- Focus on the area of molecular solids (including the coupling to the biomaterials area) offers important new opportunities.
- CMRC has a significant role in driving the development of capabilities on the planned new light sources (KEK-X and ERL).

Question 9 – Are the KEK-wide efforts in proposing joint projects on detector and data acquisition systems for (A) biological sciences and (B) condensed matter physics with Detector Development Project Office effective?

- This is another example of a labwide initiative that supports both the high energy physics and photon science community very effectively.
- ISAC was very impressed with the joint planning and early results in this area of significant importance to using both existing and new light sources.
- International collaborations can strongly enhance these efforts and ISAC endorses and encourages them.
- Obtaining additional outside funding can further leverage the KEK investments in this important area.
- The collaboration with SPring-8 is an important element of this activity.

Other Conclusions and Comments - I



- ISAC values the strong involvement in getting young people (1400 research students over multiple years) involved in PF. We note that the allocation of beam time for students and the educational component is a very important element in the PF mission.
- ISAC observes the many personnel changes and recognizes the role of young scientists and assistant professors who build a future generation of leadership
- The increasing participation in the PF users meeting is a very important development
- The science presentations at this ISAC meeting were world class – leading edge – shows capability of instrumentation/methodologies at PF
- We appreciate PF management's responding to ISACs advice
- Progress in full implementation of top off operation has been very significant. ISAC recognizes this as a very important development for operation of PF in the future. The top off operation of PF-AR is not so clear as for cost vs. benefit.

Other Conclusions and Comments - II

- The development of the pulsed sextupoles on PF is a very interesting and a positive development for improving beam quality.
- Given the opportunities for medium and longer term developments in the photon science area, we suggest that KEK considers a standing international science advisory committee that includes experts in both photon science and high energy physics.
- ISAC received the report from the Subcommittee on Life Sciences and accepts and values its recommendations. ISAC wishes to thank the external members of the Subcommittee for their advice and participation.
- Thank you to IMSS and PF staff for excellent help and organizational support to enable a most successful meeting. We also thank you for a delightful evening with KEK colleagues and a wonderful dinner Thursday evening.