Detector Workshop Proposes Coordinated Detector Development for Synchrotron Facilities

On December 8-9, 2005, more than 70 participants from the U.S. and Europe, including representatives from U.S. funding agencies (National Science Foundation/ Division of Materials Research and the Department of Energy/Basic Energy Sciences), met at the Advanced Photon Source (APS) to attend a detector workshop sponsored by the National Science Foundation, with support from the U.S. synchrotron facilities. The purpose of the workshop was to update the Workshop on Detectors for Synchrotron Radiation that was held in

Figure 1: At the detector workshop hosted by the APS, Gareth Derbyshire from the U.K.'s Diamond synchrotron and CCLRC presents an overview of detector development programs at European synchrotrons.

October 2000. The program committee for the workshop had members from all U.S. synchrotrons. The workshop was originally scheduled as part of the SRI2005 meeting in Baton Rouge, which had to be cancelled because of Hurricane Katrina. APS agreed to host the re-sited workshop, but weather seemed to be a recurring theme with this workshop as eight inches of snow fell on the afternoon of the first day.

Co-Chairperson Al Thompson reminded the participants that the objectives of the workshop were to:

– Assess recent detector developments both in the U.S. and abroad, in order to identify research opportunities that would enhance research capabilities at U.S. synchrotrons.

– Examine detector technologies, both short-term and long-term, and suggest a strategy to insure that the U.S. researchers are competitive, and remain so, in synchrotron-based science.

– Acquaint young scientists with the present state-of-the-art in detector research and to convey exciting possibilities for the future.

– Document the conclusions of the workshop as an aid to future planning.

Speakers on the first morning highlighted the needs in X-ray science (Heinz Graafsma of ESRF), FEL science (Jerry Hastings of LCLS/SSRL), and soft X-ray/UV science (Howard Padmore of ALS). Gareth Derbyshire from the U.K.'s Diamond synchrotron and CCLRC outlined the detector development programs at European synchrotrons. Advances in imaging detectors were covered in the afternoon with talks on analog pixel detectors (Sol Gruner of CHESS), drift detectors (Lothar Strueder of MPI Germany), active area pixel detectors (Ed Westbrook of Molecular Biology Consortium), and CCD detectors (Peter Denes of Lawrence Berkeley National Laboratory).

Dinner was held at the Argonne Guest House and included entertainment by Gene Ice of Oak Ridge National Laboratory, who sang a series of humorous songs he composed about his days doing research at various synchrotrons.

On the morning of the second day, developments in superconducting detectors were covered by Kent Irwin of NIST and Stephan Freidrich of Lawrence Livermore National Laboratory. A tutorial on how the high-energy physics community developed the complex detector systems was presented for the ATLAS detector

by Maurice Garcia-Sciveres (LBNL) and for the MAPS detector by Grzegorz Deptuch (BNL). In the afternoon session, Peter Siddons (BNL) spoke on progress with silicon detector arrays and Oswald Siegmund (Space Science Laboratory) presented a talk on advanced microchannel plate detectors. A lively discussion of summary points closed the workshop.

A major conclusion of the workshop was that the capabilities and throughput of many synchrotron beamlines could be improved dramatically if a program to provide detector upgrades and advanced detector development was initiated. It was universally acknowledged that effective detectors are one of the most cost-effective ways to increase scientific productivity at synchrotron sources. Unfortunately, this is similar to the conclusion derived from the October 2000 workshop, indicating that progress has been excruciatingly slow in getting better detectors on the experimental floors of U.S. synchrotron facilities.

The talks and detailed suggestions of the workshop are posted on the APS website (http://www.aps.anl.gov/News/Conferences/2005/Synchrotron_Radiation_Instrumentation/index.htm). For further information about the workshop please contact any of the workshop organizers: John Arthur (SSRL), Sol Gruner – co-chairperson (CHESS), Dennis Mills (APS), Howard Padmore (ALS), John Scott (CAMD), Peter Siddons (NSLS), Al Thompson – co-chairperson (LBNL/MBC), Ralf Wehlitz (SRC), and Ed Westbrook (MBC).

Acknowledgment

We thank the U.S. National Science Foundation for support of main workshop costs via CHESS, through award DMR-0225180. The Advanced Photon Source is supported by the U.S. Department of Energy, Office of Science, Office of Basic Energy Sciences, under contract No. W-31-109-ENG-38. ■

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