Users' Executive Committee Report

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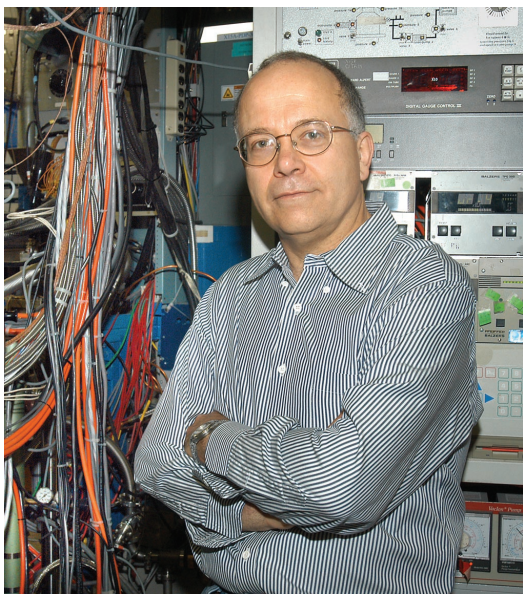
The NSLS is an environment of vital and exciting research, even as it continues in its third decade of operations. It is a strong testament to the staff of the NSLS that it operates so well. As users, we must not take their experience and ingenuity for granted. Keeping the NSLS at the top of its form in scientific productivity is a significant challenge.

In its previous (2001) review of the facility, the Office of Basic Energy Sciences (BES) of the DOE recommended that the NSLS staff should operate more beamlines for the benefit of general users, a policy that has been continuously implemented as resources permit. Early in 2005, the Science Advisory Committee was charged with the task of reviewing each beamline and advising the NSLS of which were being operated safely and effectively, and which required improvement or a significant change of management. It is gratifying to see that nearly all of the beamlines operating at that time were indeed found to be fulfilling their mission to serve the community of users.

This year, the DOE also released the preliminary results of an assessment of beamlines in all four BES synchrotron radiation facilities. I strongly recommend that everybody involved in research with synchrotron radiation take a look. It counts 179 beamlines throughout the system, 77 of which are at the NSLS. However, of 45 beamlines rated on various technical grounds as “best in class,” only four are at the NSLS. This is partly a consequence of the small number of insertion device ports available on the NSLS storage rings, and partly a result of the fact that most NSLS beamlines are relatively old. That is not to say, however, that the NSLS and its user community are letting the cutting edge pass us by. Highlights include the new X29 undulator line for macromolecular crystallography and recently constructed instruments at the X21 wiggler for small-angle scattering and studies of in-situ materials preparation. A new undulator is being put in place for X25, and an undulator beamline dedicated to small-angle scattering, to be operated in conjunction with the Center for Functional Nanomaterials, is planned for the near future. Perhaps less immediately visible to users, but no less important, is the steady upgrade of storage-ring components, such as RF cavities, the meticulous analysis of faults by the Operations & Engineering Group, and actions such as the formation of an orbit task force to assess users’ needs and meet them.

In the years from 1984 to 1993, the number of users coming to the NSLS rose essentially linearly, to somewhat more than 2000. Since 1993, that number has held essentially constant, while the number of users at all four DOE-operated synchrotron radiation sources has risen to nearly 8000. At the same time, we have seen the NSLS increasingly become a regional facility, with 62% of its users coming from the northeastern part of the country, compared, say, with 15% of Advanced Photon Source users coming from the northeast.

The above notwithstanding, the NSLS will continue to fill a critical need and play an indispensable role in American science for many years into the future. We continue to hold our own as a leading source of research productivity in many fields. But it is equally clear that the opportunity is upon us to push the envelope of science and technology beyond the capabilities of any existing synchrotron radiation source. This is the case for NSLS-II, a new machine with brightness beyond any synchrotron source in existence or planned, essentially to the theoretical limits of storage ring performance. Along with research that can be performed at



other facilities, NSLS-II will indeed be a national facility, as the original NSLS once was, with capabilities unequalled elsewhere in the world.

Defining the scientific needs and opportunities of what will be the world's brightest storage ring for synchrotron radiation is an enormous job. For this, we gratefully acknowledge years of effort by many people: countless current synchrotron radiation users and members of the NSLS user science division, who organized and participated in workshops in 2003; the NSLS Accelerator and Operations & Engineering divisions, who have been pushing (so far, theoretically) the limits of storage ring brightness; and especially NSLS-II Project Director Steve Dierker and BES Associate Director Pat Dehmer, who have advanced and refined the case within DOE. Earlier this year, these efforts bore fruit with the signing of Critical Decision Zero (CD-0) for NSLS-II by the DOE. This signifies that the DOE acknowledges the need for the facility, and is receptive to a proposal for a specific plan and design. As I write these words, the President's budget for fiscal year 2007 has just been announced, with substantial resources committed to the NSLS-II project. This promises to be an exciting time for all of us associated with the NSLS.

It has been a stimulating year for the NSLS, and for the Users' Executive Committee. I am grateful for the hard work and thoughtful suggestions of the other members of the UEC and its special interest groups, and to all of you who have communicated your needs and interests to our representatives in the federal government. But I especially salute your most important achievement, safely doing excellent science at the NSLS!