

Preface

This Annual Report describes the activities of the National Superconducting Cyclotron Laboratory (NSCL) from January 1, 2000, to December 31, 2000. During this time, the Laboratory's priority was the timely completion of the coupled cyclotron and the helium refrigerator upgrade projects while implementing several building renovations and maintaining a forefront research program in nuclear science, accelerator physics, and related instrumentation R&D. Reliability improvements (e.g., replacements of old vacuum pumps, power supplies, and cryo-monitors, and RF-system modernization) continued as allowed by budgetary constraints.

All milestones for the coupled cyclotron project and the cryo-upgrade project were reached on or ahead of schedule. The first beam from the coupled cyclotrons was extracted ahead of schedule on October 10, 2000. In December 2000, the new cryo-plant was connected to the existing NSCL cryo-distribution system, and commissioning of the new cryo-system was scheduled to begin in January 2001.

A major building renovation that includes the conversion of lab space into much needed office space and a complete refurbishment of the HVAC (heating-ventilation-air-conditioning) system in the east wing of the NSCL office building is under way.

During 2000, NSCL staff continued to be actively involved in shaping the concept for an advanced rare isotope accelerator, RIA. With significant input by many colleagues from around the world, the White Paper "Scientific Opportunities with Fast Fragmentation Beams from the rare Isotope Accelerator" was completed in March 2000 and widely distributed to the nuclear physics community. This White Paper can be found at: <http://www.nscl.msu.edu/research/ria/whitepaper.pdf>. The NSCL also co-sponsored a RIA workshop held in Durham, NC, on July 24 - 26, 2000. The workshop White Paper can be found at: <http://www.nscl.msu.edu/conferences/riaws00/ria-whitepaper-2000.pdf>.

Several new R&D initiatives were begun: construction of a gas stopping facility (funded by DOE), construction of a high-field Penning ion trap for precision mass measurements of short-lived isotopes (funded by MSU), and construction of a clean-room and chemical treatment facility for a new R&D program in superconducting radiofrequency cavities (funded by MSU). A first test of a superconducting $\beta = 1$ cavity (on loan from Jefferson Laboratory) was conducted in December 2000. Several Laboratories, including Jefferson Laboratory, the University of Milan, and the University of Legnaro, collaborate with the NSCL on the development of superconducting RF technology relevant for RIA.

The new NSCL Germanium Array had its commissioning run with beams from the ATLAS facility at Argonne National Laboratory in November 2000, followed by a full-fledged low-energy Coulomb excitation experiment with beams of ^{124}Xe and ^{126}Xe in December.

By the end of the year, the new 5-year operating proposal was being finalized, and intense preparations were underway for a detailed cost review for RIA in January 2001. The material for this cost review was prepared by an ANL/MSU collaboration.

In order to improve accessibility of the NSCL to users, Dr. Raman Anantaraman has been appointed Assistant Director for User Relations. He will coordinate various user-related activities, including user workshops, student training programs, user safety-training, and beam-time scheduling.

During 2000, the research productivity of the NSCL remained high. Much of this research and of the ongoing technical work is summarized in this annual report.

As in the past, we welcome advice and suggestions from all readers on how this Annual Report could be made more useful or what could be done to make the NSCL a more supportive place to do research within existing financial constraints.

C. Konrad Gelbke, Director