

Preface (1997 Annual Report)

This Annual Report describes the activities of the National Superconducting Cyclotron Laboratory (NSCL) from January 1, 1997, to December 31, 1997. Major efforts of the laboratory were focused on implementing the "K500 K1200" coupled cyclotron project (CCP) and on operating the NSCL as a national user facility and carrying out a forefront research program in nuclear science, accelerator physics, and related instrumentation R&D.

In 1997, work on the CCP became the top priority for laboratory activities. Up to now, all milestones have been achieved on time. Since the laboratory had to redirect significant resources from operation of the experimental program to the CCP, some adjustments in maintenance and beamtime schedule were needed. Nevertheless, a seven-days per week operating schedule could be maintained. The risk of decreased reliability of K1200 operation was carefully monitored and judged to be still acceptable when compared to the alternative option of significantly decreasing the amount of beamtime available to users. (The average reliability of the K1200 operation was 88%, as compared to 91% in 1993-1994.) As much as possible, the laboratory will give priority to running the experimental program and will delay accelerator improvement projects until the CCP-related shutdown (from mid 1999 until the end of 2000).

Two major issues have emerged during this year. (1) In view of the age of the existing low conductivity water (LCW) cooling system and the CCP-related need to increase cooling capacity, it seemed most prudent to combine the capacity upgrade with a replacement of old and failure prone LCW cooling equipment. This approach was made possible by combining the budgeted funds from the CCP with additional, new funds provided by Michigan State University (MSU). The system was installed in mid 1998. (2) A detailed analysis of recent operating failure modes and extrapolation to the anticipated operating needs of the coupled cyclotron facility (CCF) needs has led to the conclusion that the presently installed cryogenic capacity is insufficient to ensure reliable CCF operation. Various cryoplant upgrade options will be explored and evaluated for their technical merits and cost benefits in 1998.

Pressure for beam time continues to be high, and the NSCL continues to be oversubscribed. PAC 22 (January 1997) and PAC 23 (October 1997) received combined requests for 7,363 hours of beam time; 4,230 hours were approved for research. About 85% of the approved experiments were collaborations between outside groups and NSCL staff.

During 1997, the research productivity of the NSCL remained high, and a large number of exciting new results in reaction dynamics, nuclear astrophysics and in the understanding of nuclei far from stability emerged. A proposal to acquire a highly segmented Germanium array for Coulomb excitation measurements with radioactive beams was funded by the NSF and MSU. Much of this research and of the ongoing technical work is summarized in this annual report.

We welcome advice and suggestions from all readers on how the contents of 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 the existing severe financial constraints.

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