

FY2002 Activities

A. Summary

The 2002 fiscal year represented the third and last year of operation for the Cooler ring using the newly-developed intense beams from the Cooler Injector Synchrotron. For this year, three experiments required the use of deuteron beams. The polarized deuteron beam capability had been developed earlier, and this year was put to use for the studies of the breakup channel accessible from deuteron-proton collisions and the manipulation of the polarization of the deuteron in a storage ring. The charge symmetry breaking experiment required a very intense unpolarized deuteron beam, and development pushed that to what appeared to be a limit at roughly 2 mA of circulating deuterons. The year began with an extended access period to install the new target box and Pb-glass Čerenkov detectors needed for the charge symmetry breaking experiment.

Operation of the Cooler ring was brought to a close on July 29. Following a long and successful run for this storage ring, modifications were started on the Cooler hall to prepare a beam line for the study of radiation effects in materials.

Four experiments were completed on the Cooler. These included: (1) the measurement on a number of spin correlation coefficients for the $d+p \rightarrow p+p+n$ breakup reaction, concentrating on the longitudinal analyzing power A_z , (2) the measurement of spin correlation coefficients in the $d+p \rightarrow t+\pi^0$ reaction, (3) the observation of the charge symmetry breaking $d+d \rightarrow {}^4\text{He}+\pi^0$ reaction just above threshold, and (4) the manipulation and depolarization of a deuteron beam stored in the Cooler ring in the presence of RF-induced depolarizing resonances.

In order to determine the optimum strategy for completing the experimental program on the Cooler, a brief meeting of the Program Advisory Committee was held. There were two reviews of the laboratory, one by the National Science Foundation to assess progress under the new scientific grant and another by the Indiana University Visiting Committee to review the relationship of the university with the laboratory. The programs for these meetings are summarized below.

B. Completed Experiments

Exp. No.	Spokesperson(s) <i>Title</i>
CE-64	Hans Otto Meyer <i>Breakup in the $p+d$ Reaction (Beam and Target Polarized)</i>
CE-79	Wilfried Daehnick (University of Pittsburgh) and Barbara von Przewoski (IUCF) <i>Exploration of Three-Nucleon Forces with the Reaction $pd \rightarrow t\pi^0$</i>

CE-82 Andrew D. Bacher and Edward J. Stephenson (Indiana University)
A search for the charge symmetry breaking reaction $dd \rightarrow \alpha\pi^0$

CE-83 Alan D. Krisch (University of Michigan)
Spin manipulation of polarized protons and deuterons

C. Program Advisory Committee

The IUCF Program Advisory Committee met December 17, 2001 to discuss the completion of the experimental program on the Cooler ring. The committee members were Willen T.H. van Oers (chair: University of Manitoba), Alan Krisch (University of Michigan), Brian Serot (Indiana University), and Werner Tornow (Duke University).

The following presentations were made to the committee:

<u>Name</u>	<u>Topic</u>
Hans Meyer	PINTEX
Edward Stephenson	CSB
Alan Krisch	Spin Manipulation
Peter Schwandt	Space Charge Effects and PFC Proposal

D. NSF Site Visit

The National Science Foundation created a panel to visit IUCF and review the progress during the first year of the new grant. The members of the Committee were Alan Nathan (chair: University of Illinois), Allison Lung (Jefferson Laboratory) and R. Bruce Vogelaar (VPI/SU). Brad Keister and Sherry Yennello represented the National Science Foundation. The meeting was held May 20-21, 2002 at IUCF.

The following presentations were made to the committee:

<u>Name</u>	<u>Topic</u>
Steve Vigdor	Overview
Hans Meyer	Cooler Experiments on Three-body Forces
Edward Stephenson	The Charge Symmetry Breaking and Tagger Experiments
Rex Tayloe	Neutrinos and mini-BooNE
Mike Snow	Fundamental Physics with Cold Neutrons
Scott Wissink	STAR – SPIN Physics
Will Jacobs/Jim Sowinski	EEMC Construction
John Cameron	Education and Synergistic Activities
John Cameron	Budget Discussion

The presentations were followed by a poster session.

E. Indiana University Visiting Committee

The Visiting Committee met September 26—28, 2002, to consider the relationship between the university and the laboratory. The members of the committee were Anthony Thomas (chair: University of Adelaide), Lawrence Cardman (Jefferson Laboratory), Paul Deluca (University of Wisconsin), Jay Flanz (Massachusetts General Hospital), Reinhard Gahbauer (Ohio State University), Robert Redwine (Massachusetts Institute of Technology), and Sam Werner (National Institute of Standards and Technology).

The following presentations were made to the committee:

<u>Name</u>	<u>Title</u>
John Cameron	Laboratory Overview

Nuclear Physics Program

Scott Wissink	The Nucleon's Spin
Will Jacobs	STAR-EEMC Construction
Hans Meyer	The Cooler Closeout
Rex Tayloe	Weak Interaction Program

Radiation Effects Program

Tom Rinckel	RERP II Construction
Tom Ellis	Plans for RERP III
Mircea Chipara	Radiation Effects on Nano-devices

Accelerator Physics

S.Y. Lee	NLC and other Accelerator Physics Challenges
Peter Schwandt	Construction and Consulting

MPRI Business Initiative

Dennis Friesel	MPRI Construction
Alan Thornton	Radiation Therapy Plans
J. Kerstiens	The Business Plan

Cold Neutron Source Project

Dave Baxter	The LENS Source and Instruments
J. Zwanziger	Overview of the LENS Program

Administration

Andy Bacher	Education, REU, and Graduate Students
John Cameron	Budget and Management