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SUMMARY OF INFORMAL MEETING ON
"FACILITIES FOR ATOMIC PHYSICS RESEARCH WITH HIGHLY IONIZED ATOMS"

Held at
APS Division of Electron and Atomic Physics Meeting
University of Connecticut, Storrs, Connecticut - May 30, 1984

C. L. Cocke
Kansas State University, Manhattan, Kansas 66506

K. W. Jones*
Brookhaven National Laboratory, Upton, New York 11973

An informal meeting to discuss "Facilities for Atomic Physics Research with Highly Ionized Atoms" was held during the APS DEAP meeting at the University of Connecticut on May 30, 1984. The meeting was motivated by the realization that the status of facilities for studies of highly ionized atoms is unsettled and that it might be desirable to take action to ensure adequate resources for research over the whole range of charge states and energies of interest. It was assumed that the science to be done with these beams has been amply documented in the literature.

The meeting was attended by over thirty interested scientists. We have attempted to summarize the important points that were made, but emphasize that we do not pretend to speak for the entire gathering.

The meeting centered on the use of proposed new accelerator facilities at Kansas State University and the BNL Tandem Accel-Decel Facility for production of ion beams with high charge states at varying velocities. Brief descriptions of the two laboratories were given by the authors of this report.

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The discussion which followed centered largely on the BNL facility since immediate action is necessary to keep it in use for atomic physics.

The salient points that were made about the BNL laboratory were the following:

1. The BNL Accel-Decel capability is unique at the present time. It unites work done with ECR- or EBIS-type ion sources at low energies with experiments using identical charge states at higher energies.
2. The high energy capabilities are comparable to those which exist at the Holifield Tandem Laboratory, ATLAS at Argonne, or other laboratories with Tandem/Linac accelerators, e.g., Florida State or SUNY/Stony Brook.
3. High quality negative ion beams up to 12 MeV are not available elsewhere.
4. High current (~ 100 μ A peak) pulsed operation is available.
5. The general quality of the BNL operation was agreed to be excellent. Past users of the facility were very enthusiastic in their praise of the ease of doing experiments there.

The cost of using the BNL Tandem accelerators as a dedicated facility for atomic physics research 25% of the time was given as \$200,000, \$400,000, and \$200,00 for the three fiscal years FY 1985-1987. The time fraction could probably be increased if the need exists and the money increased.

The ultimate requirement for the machines is, however, to be determined by their use for injecting heavy-ion beams into the AGS (Alternating Gradient Synchrotron) for experiments in relativistic heavy-ion physics.

Several people pointed out that the use of the laboratory as a dedicated facility would be very helpful and increase efficiency. This is because it would be possible to set up experiments in a semipermanent way for intermittent runs on a difficult experiment requiring complex equipment.

Some time was spent on consideration of capabilities of other laboratories in terms of the ions that could be provided, availability of beam time, and possibility of setting up dedicated beam lines. It became clear during this time that no other laboratory facilities presently in existence could be considered a complete substitute for the BNL laboratory used in a dedicated mode.

It was also apparent that the KSU accelerators when in full operation would extend what could be done at BNL and provide reasonable substitutes for many of the BNL beams.

The coordinated use of the accelerators at KSU and BNL would therefore be reasonable in terms of the uses for atomic physics

research. The period from the present until the KSU laboratory is fully operational would be handled by the Brookhaven machines. Ongoing atomic physics programs would then be able to move to KSU for extension and completion. The necessity for continued use of BNL could be evaluated then to see if need for further operation existed. (It might be that 100% use for nuclear physics will be required at that time.)

Consideration was given to the cost for the proposed BNL project. Several people expressed the feeling that the cost was not large in absolute terms, and indeed was small compared to the magnitude and excellence of the accelerator facilities.

The conclusion of this part of the meeting appeared to be that there were no strong objections to the proposals that had been put forward and that there were several highly positive reasons for proceeding to seek funding.

The discussions went on to consider the use of EBIS and ECR facilities for a brief time. It was pointed out that ECR sources at ORNL and LBL would be available for outside use for atomic physics, but would have other primary missions. The proposed EBIS source at KSU would be available as a user facility and could be used for

ion-electron experiments in conjunction with beams from the tandem-linac accelerator. The Cornell EBIS was mentioned, but not discussed since Professor Kostroun was not present.

It seemed clear that there would be several very diverse apparatus running and that it might be useful to make capabilities and conditions of use generally known to all atomic physicists. This thought was then extended to include all the equipment that had been mentioned during the meeting. While there was probably some feeling that continuation of a chaotic situation could be perfectly acceptable, it was also suggested that a more formal workshop extending discussions which took place here could be useful.

As a result, a possible workshop was proposed as an adjunct to the NTSU Accelerator Conference to be held November 12, 13, 14, 1984. Sheldon Datz agreed to help with organization and agenda.

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