

Synchrotron Radiation Center University of Wisconsin-Madison

December 22, 1983

TO ALADDIN USERS AND OTHER INTERESTED PERSONS:

This letter is addressed to potential Aladdin users, persons who have had some role in the Aladdin project, and interested spectators. It is to explain the present status of the Aladdin project, recent staff changes, and what we see as the progress expected in the next year or so. In part, it is to dispel possible rumors about the recent and future history of Aladdin. It summarizes incompletely a great deal of information. I hope the summary is reasonably accurate and not misleading. If you are interested in only one aspect of this letter on the project, you can skip to the appropriate section which follows: history-personnel changes, technical history and the future, financial, beam-line and user complement.

History and personnel changes. Last spring, Aladdin had captured electrons from its 100 MeV microtron injector and had accelerated them to 750 MeV. Single-bunch and stacking operation had been demonstrated, but currents were well below 1 mA. Partly because no improvement in stored current had occurred for a long time, NSF requested two reviews of the Aladdin project, one technical and one on the scientific program. The former took place on May 19-20, 1983. The site-visit committee consisted of H. Grunder (LBL), Chairman, E. Patterson (SLAC) and C. Pellegrini (BNL). In short, they recognized that Aladdin was a well-designed machine and that its construction had progressed remarkably, given the low budget its construction had had, and the tiny size of the construction staff. They recommended that considerably more staff be hired so several problems could be attacked in parallel, and that there be some organizational changes. The scientific review took place on June 5-7, 1983, concurrently with mail reviews of the proposal for the three-year funding of the operation of Aladdin. The site visit committee consisted of K. Klierer (Argonne), R. Bauer (Xerox), C.P. Flynn (Illinois), H. Grunder (LBL), and L. Schmidt (Minnesota). They, too, noted how much had been done by so few, but that changes must take place: increased staff, management changes, and adequate funding. The scientific case for the completion of Aladdin was viewed as strong.

The first response to these requests on the part of the University of Wisconsin was to set up an executive committee for the overseeing of the Aladdin project and to begin the creation of nine new staff positions. The executive committee, composed of Wisconsin staff members, played an important role in effecting the changes described below. Since their role is changing, I will not go into their present role in detail.

By the time of the annual program review in October, it was clear to NSF and to many of us that the staff increases had come too slowly (none of the nine new positions had yet been advertised) so the users advisory committee, [D. Lynch (Iowa State/Ames Laboratory) Chairman, J. Weaver (Minnesota), K. Klierer (Argonne), R. Madden (NBS), G. Lapeyre (Montana State, J. Taylor (Wisconsin) and

Z. Hurych (Northern Illinois) were the members present, along with G. Margaritondo (Wisconsin)], strongly suggested that all of the available staff of the Synchrotron Radiation Center be put to work directly on Aladdin itself. Ed Rowe quickly responded to this, and the staff working directly on the storage ring went immediately from three to eleven. The cost was that all work on beam lines for Aladdin stopped, and that services to users of Tantalus might deteriorate due to the training of new operators. (Service has not deteriorated noticeably.) Several of these new staff are engineers obtained on loan from the Physical Sciences Laboratory, with one more planning to start work this month. As a result, two-shift testing began within a few days of that meeting in late October.

Additional technical help has become available. Yanglai Cho, generously loaned to SRC by Argonne, has spent all of the Fall working on Aladdin itself, and a four-man group from the accelerator division of Lawrence Berkeley Laboratory has just finished a one-week stay at SRC with return visits including additional persons planned. Consultants have visited: Don Kerst several times per week from the University of Wisconsin and Jack Reidel, a radio frequency expert.

There was another NSF site visit on November 16. It included both the technical site-visit committee (augmented by the addition of B. McDaniel, Cornell) and several NSF staff. Both groups met with the administration of the university. The end result of this meeting was the recommendation that funding should be adequate or none at all, with adequate funding, i.e., the full proposed amount, strongly recommended.

In response to the NSF recommendations, the university has made SRC a separate administrative unit in the Graduate School. Two new administrative positions were created; that of Associate Director and a Director. Both of these were not to be directly involved in the construction of Aladdin, which would remain in the hands of Ed Rowe. The director was visualized as a senior scientist with considerable accelerator experience, and the associate director as a senior scientist with experience as a user (or possibly a theorist with interests aligned with those of users). Both positions would carry faculty status, and both will be advertised shortly.

In the interim, an Acting Director and Acting Associate Director have been found. Keith Symon of the Physics Department at the University of Wisconsin will take the former position for at least the spring semester, or until a permanent Director is found. He will devote about 80% of his time to it. I will take leave from Iowa State for the months of January-June 1984 to serve in the latter position, commuting nearly every week to be in Stoughton 3-4 days. Both of us will deal with hiring, purchasing, personnel relations, reporting, documentation, etc., leaving the accelerator staff free to do accelerator physics. We also will try to locate our permanent successors.

Technical history and the future. Aladdin works at low current. The problems all involve getting higher currents. They begin with more efficient capture of electrons from the injector. To this end, two approaches are being tried. One is a modification of the injector microtron to provide shorter output pulses of higher instantaneous current through the installation of a gridded electron gun. The other is to attempt a different mode of capture of electrons in Aladdin, adiabatic capture. This would be relatively easy to try, were it not

for the fact that multipactoring (essentially a discharge of secondary electrons) could take place in the rf cavity during injection, thereby damaging it.

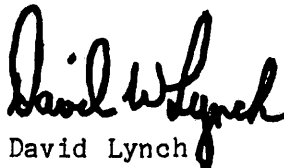
The rf supply now in use cannot supply enough power for high-current operation. The new one is complete, but suffers from potentially destructive parasitic oscillations. While it is being debugged, a power supply of intermediate power is on loan from LBL which will permit currents adequate for SR research, but below ultimate current goals. Beam position monitoring is being implemented. Additional machine problems remain, all of them surmountable in time. These include obtaining a better knowledge of the hysteresis in all magnets so that the ring can be brought up more rapidly after slow turn-offs or sudden power failures, current instabilities at higher currents, and the addition of shielding (after a radiation survey). Many of these problems can now be attacked in parallel by the newly-expanded staff and the two-shift operation. An estimate of the date when Aladdin will be ready for the first user is difficult to make, but it appears that late April, 1984 is reasonable. At this point a 10 mA current of 750 MeV electrons should be achievable after an injection time of two hours or less, with a half life of at least 1 hour. The storage ring would have adequate shielding in place at that time.

Financial. The project appears to be in its best financial condition ever. NSF is extending the present contract through March 1984. We have been requested to submit in January our budget for the first year under our three year proposal.

Users and beam lines. Aladdin has gained several outside user groups in the past year, users who have obtained funding for their own beam lines. Many of these beam lines are finished, except for connection to Aladdin, or under construction. At least two other proposals for user-owned beam lines have been submitted to funding agencies. A list of beam lines is appended, along with the names of the permanent staff associated with each. (I hope I have not omitted anyone. If so I apologize.) There are also new monochromators for public use, as well as some that will be moved from Tantalus with little refurbishing (or a lot, depending on the monochromator). The user-owned beam lines are available to the general user for 25% of the year.

This is the first of several pastoral letters I expect to write. Others will deal with progress on the accelerator and beam lines, and with any changes in organization of either the SRC or of users, as well as any policy changes which might affect users. I welcome questions and suggestions, especially nominations for the new staff positions.

Sincerely,



David Lynch
Acting Associate Director

DL:lmb

FUNDED BEAM LINES
to be mounted on Aladdin

SRC-owned

Mk2 GGIM
Mk5 GGIM
4m NIM
6m TGM
"Virtual". 6m TGM
6/10m TGM
3m TGM
1m Seya

PRT-owned

ERG - U. of Illinois (Brown, Chiang, Flynn)
ERG - U. of Wisconsin-Chem., Phys. (Margaritondo, Taylor, Höchst)
ERG+2m Seya - Iowa State Univ. & Montana State Univ. (Lapeyre, Lynch, Olson)
ERG+2m Seya - U. of Minnesota & Argonne Nat. Lab (Arko, Franciosi, Weaver)
GGIM - National Research Council of Canada (Bancroft, Tan)
ERG & TGM - Cornell Univ., U. of Texas & Sandia Nat. Lab. (Erskine,
Knotek, Rhodin)
1m NIM - Northern Illinois U. (Benbow, Hurych)

GGIM = 2m grasshopper grazing incidence monochromator

ERG = 2m & 5m extended-range grasshopper

TGM = toroidal grating monochromator

NIM = normal-incidence monochromator