Aladdin

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THE ALADDIN PROJECT

NOTES TO INTERESTED BYSTANDERS - IV

On May 5, 1979, the official groundbreaking ceremony for the Aladdin Building was held. Several shovelfuls of somewhat rocky soil were shifted from one spot to another at the newly uncovered bedrock level of the Aladdin site (adjacent to the present Physical Sciences Laboratory building). Official groundbreaking ceremonies postdated by approximately three weeks the actual onset of construction by the contractors, so the 60 or more guests assembled in the 140 x 140 foot excavated hole for the ceremony.

On hand with congratulatory comments were R. M. Bock, Dean of the Graduate School of the University of Wisconsin-Madison; Ragnar O. Rollefson, Professor Emeritus of the Physics Department, University of Wisconsin-Madison, and former Director of MURA (Midwest Universities Research Association - the predecessor of PSL before the laboratory was incorporated into the University of Wisconsin system); Keith Symon, Chairman of the University of Wisconsin Physics Department, and former Technical Director of MURA; Marshall Keith, former Administrative Director of MURA; and Fred Brown from the University of Illinois, Champaign/Urbana. Fred was the first to propose using Tantalus I as a photon source, and among the first users of its radiation. (Ulrich Gerhardt was the first by a matter of hours.) Fred vowed to also be among the first to use Aladdin.

Following the ceremony, all adjourned to the shelter of the PSL library for liquid refreshments, food, and festivities.

This groundbreaking ceremony was particularly satisfying to the resident staff because, after long months of negotiations and efforts by all involved with the project, tangible signs of progress were clearly evident at last. Thanks are in order to many who have made possible the progress leading to this auspicious event. We gratefully acknowledge their important roles and only regret that many who contributed so much were unable to attend. Our thanks to them and to those in the U. S. and around the world who sent congratulations.

Ed Rowe presenting the ceremonial shovel to Ragnar Rollefson (left) and taking a shovelful of soil himself (above). They are at bedrock level of the 8 ft. excavation for Aladdin.

There has been a great deal of activity since the last Notes were distributed. The ground-breaking for Aladdin was a highly visible step forward. As of this writing, the site has been fully excavated and half of the footings have been poured. Now that construction has begun, work is proceeding at a gratifying pace. It is expected that the building will be completed and in the hands of SRC personnel by December 1979 or January 1980. Many of the components for the storage ring and ancillary equipment have been completed and checked out. They await transfer to the building when it is completed for final check-out and installation on site.

All of the bending magnets have now been finished. The final machining was completed during the winter. Half of the twelve magnets are complete with plumbing and electrical fixturing; fixturing of the remaining magnets is in progress. The next and final step will be the magnetic field measuring and analysis.

Kinematic mounting pedestals for the bending magnets have been completed, and the magnets presently rest on these pedestals. For the time being, they are being stored in the high-bay area of the PSL shops.

The quadrupole magnets have been fabricated, and several have been assembled for the purpose of magnetic field mapping. Some care has been taken to develop the hardware for the field mapping system required to determine the multipole filled components and the magnetic centers of the quadrupoles. The latter is particularly important because, with the magnetic centers known to within a few mils, quadrupole alignment can be optimized and undesirable coupling can be minimized -- all with the goal of keeping the beam size as small as possible (projected size $4\sigma_x = 2.1$ mm; $4\sigma_y = 300$ μm).

Theoretical modeling of the inflector and kicker elements has been completed, and discussions with the engineering staff and shop personnel are underway to implement the design.

The inflector and kicker driving circuits have been modeled at low power, and components for the full power units are now largely on hand.

The high voltage power supplies for the inflector and kickers have been ordered.

The in-tank pumping system has been designed, and a prototype unit has been constructed and checked out, as discussed in earlier notes. The prototype of the switching units for remote control and monitoring of the current from each of the in-tank pumping elements is under test. Preliminary data have been gathered after many thousands of switching cycles, using a high-vacuum, high voltage relay. The current will be measured using an operational amplifier with 8 kV of common mode rejection.

The quadrupole magnets, steering magnets for the beam transport line, and their power supplies have been delivered. Designs for the two bending magnets have been completed, and work on those units is underway.

The RF system is nearing the point for testing.

The first of three control computer modules is due to be delivered within days. The first will be used with the RF system; it and the RF system will be debugged as a unit. The remaining two modules are for the magnet system and the injection computer control system.

A two-celled section of the Π mode, slot-coupled linac for the microtron has been built and is almost ready for high power testing. Only the tuning slugs and the slot for coupling to the waveguide remain to be installed. A considerable amount of work has had to be done to determine ideal characteristics for the cavity-cavity coupling slots.

A mock-up of a small section of the microtron magnet has been built to check calculations of the number of ampere-turns needed to generate suitable reverse magnetic fields upstream of the bending magnets, fields which provide vertical beam focusing. The mathematical modeling proved very accurate.

The iron sections for the main microtron magnets have been assembled. Each of the four magnet sections has five six-inch iron blocks bonded and bolted together. Machining of the pole surfaces and mating surfaces has been completed.

Coils for the main magnets and the magnetic field clamps for the microtron have been finished. Bids for the power supplies have been solicited.

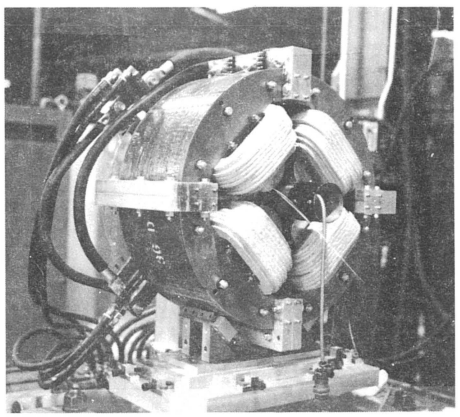
The sextupole pieces and parts are ready for assembly. The power supplies for the sextupoles have been ordered.

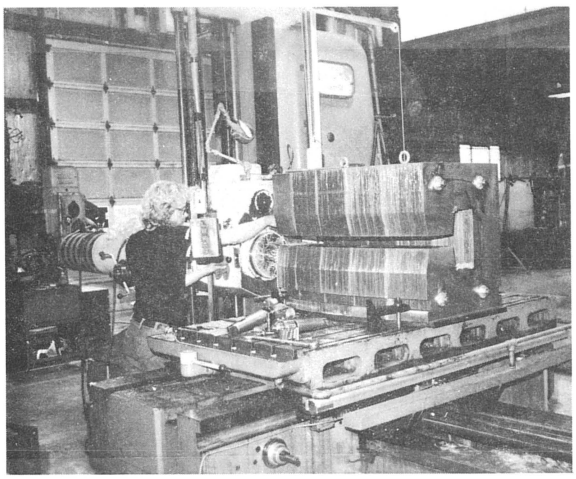
Interface circuit boards for the beam position monitor electrode are now complete, and work has begun on the data conditioning system necessary to display the information that the beam position monitors provide on the control TV monitor.

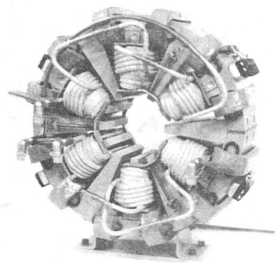
PERSONNEL:

Dr. Pamela Woodruff joined the scientific staff of the SRC in January of this year. Her area of expertise is gas phase photoelectron spectroscopy. She is setting up an experimental program that will exploit the high resolution capabilities of the soon-to-be commissioned four-meter monochromator. It is expected that she will be closely involved with the development of similar instrumentation for Aladdin.

J. H. Weaver, Scientific Staff
E. M. Rowe, Director, SRC







Top: One of the a assembled quadrupoles ready for field mapping.

Center:
A completed sextupole

Bottom:
The main power amplifier for the RF system.

Above: Final machining of one of the assembled bending magnets for Aladdin. Below: A bending magnet with electrical and water fixturing ready for field mapping. It is supported by a kinematic mounting pedestal. Other magnets are shown in the background.