

## VI. THE LINEAR-ACCELERATOR PROGRAM

Prof. J. C. Slater	P. T. Demos
Prof. A. F. Kip	M. Labitt
Dr. W. H. Bostick	L. Maier
R. J. Debs	I. Polk

J. R. Terrall

Since the last progress report, the concrete shield for the accelerator has been finished and the accelerator has been moved inside the shield. All of the required modifications have been made, and the machine is now almost ready for the first test runs.

Important modifications which have been made include the following: shortening of the independent sections of the accelerator from four feet to three feet (to eliminate TE mode difficulties, as explained in the last progress report), and the provision of a separate tuner in each one-foot length of accelerator. This latter modification was made in order to keep the fields nearly constant along each three-foot section for any position of the tuners which will be required. The tuners are ganged in groups of three and remotely controlled as explained in the last progress report.

In assembling the three-foot sections it has been found advantageous to test each group for uniformity of excitation along the length. In cases where there is a noticeable variation in the field along the length of the section, tuning of one section has been made until the excitation is uniform. This tuning has been accomplished by inserting thin cylinders ( $1/8$  inch thick) in the drift tubes between sections. The depth of insertion of the cylinders into the cavity controls the amount of tuning, and the adjustment is made empirically.

Some modifications in the Van de Graaff generator have been made, and a new vacuum tube is now ready for installation. Development of a new filament and electron gun for the generator is well along. As mentioned earlier, we expect to increase the beam current by a factor of 100 over our former peak currents of about 0.1 milliampere. The separate pumping system for the generator is nearing completion. This system and the associated cold traps and irises between the generator and the linear accelerator have been designed to minimize any contamination of the vacuum tube by microwave discharges occurring in the accelerator. A gate valve between the Van de Graaff generator and the accelerator allows isolation of these two parts of the evacuated system, in case either part needs to be let down to atmospheric pressure for repairs or modification.