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Test New Instrumentation in Linac and HEBT

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LINAC STUDIES. (06-00 to 14-00 JULY 16TH, 1974)

(K. BATCHELOR, J. SHEEHAN, R. WITKOVER, N. FEWELL, R. LANKSHEAR)

Objectives

1/ To see if a biased ring in front of the VB #1 emittance measuring slit to sweep away secondary electrons improves the emittance measurment (N. FEWELL)

2/ To test a new amplitude control system in Tank #3. (J. SHEEHAN)

3/ To introduce a coaxial switch in the debuncher which allows automatic de-tuning of the debuncher whenever pulsing is turned off and to check out the fast phase control and its effect on the beam momentum and momentum vs. time. (K. BATCHELOR and R. LANKSHEAR).

4/ To test out the new bending magnet arrangement in the BLIP line (K. BATCHELOR)

5/ To make preliminary tests on a beam density distribution monitor installed in the BLIP line (R. WITKOVER)

Results

1/ A problem with a crossed cable gave initial results which did not make sense! After correcting the cabling an electron current of 40 mA was picked up on the bias ring without the emittance device in the beam. Since, by the time the cable problem had been discovered the measurements were transferred from VB #1 to VB #4 it was not possible to test the effect of the bias ring on the measured emittance.

2/ The new amplitude control in Tank #3 worked successfully with an improvement of the r.f. settling time and the residual error during the beam time. The settling time was reduced from ~ 50 μsec to ~ 15 μsec and the residual error to less than 0.1%

3/ The coaxial switch on the de-buncher is now operating in a manual mode. The fast phase loop operates correctly giving less than 10 KeV change in energy during the beam pulse. The bunching factor with a power level of ~ 30 Kwatt in the debuncher was in agreement with the value calculated.

4/ The new bending magnet power supply in BLIP requires the addition of a shunt across one magnet (BM #2) or a extra horizontal dipole steering magnet.

5/ Initial tests on the density distribution monitor showed some indications of beam induced electrons. Further tests need to be made to determine whether these are secondary electrons or beam induced thermionic emission.