

## Measure Vertical Emittance of FEB in Test Beam

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FEB Commissioning Study

NO. 27

Wed. May 16, 1973

Bennett, Blumberg, Gutty, Keane

Scheduled: 0001-0800 Actual: 0001-0820

Objective: Measure the vertical emittance of the bunched, high intensity FEB

Result: Success. We obtained numerous ( $\sim 20$ ) profiles from the array of 24 insulated plates in the test beam instrument box for each of about 15 settings of the external quadrupole UQ2. The late CBM was about  $3.5 \cdot 10^{12}$  ppp and we were extracting about 20% of it. The U16 current transformer indicated that we were extracting parts of 6 bunches, although there was no clear evidence that we were extracting any one bunch completely — in contrast to previous observations that we could extract 4 complete bunches from a  $1.5 \cdot 10^{12}$  internal beam.

The radial instability, previously noted at  $1.5 \cdot 10^{12}$ , re-appeared intermittently. The symptom is a radial inward excursion immediately after FEB, with complete loss of the beam on the inside of the ring at about 3 msec after  $t_{\text{FEB}}$ . At lower CBM we previously suspected that removal of entire beam from  $\sim 50\%$  of azimuth left too little beam in machine for adequate signal for radial position servo. Tonight's result puts that explanation in question. We were able to eliminate loss by a compensating outward radius shift. The effect will therefore probably not be an operational problem. We should, however, study the radial signal after  $t_{\text{FEB}}$  and also investigate accuracy of the CBM after multi-bunch extraction.

# EXTRACTED BEAM VS. HIO MAGNET POSITION

NORMALIZED TO CBM      CBM  $\sim 4.5 \times 10^{12}$  PPA  
 MAGNET POSITION IS UPSTREAM, END OF SEPTUM  
 TO BEAM CODE AXIS  
 SKEW = -3 MRAD

