

## Horizontal Emittance at High Intensity, try I10 Extract

G. W. Bennett

May 1973

Collider Accelerator Department  
**Brookhaven National Laboratory**

**U.S. Department of Energy**

USDOE Office of Science (SC)

Notice: This technical note has been authored by employees of Brookhaven Science Associates, LLC under Contract No.AT(30-1)-16 with the U.S. Department of Energy. The publisher by accepting the technical note for publication acknowledges that the United States Government retains a non-exclusive, paid-up, irrevocable, world-wide license to publish or reproduce the published form of this technical note, or allow others to do so, for United States Government purposes.

## **DISCLAIMER**

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

Blumberg

NO. 30 FEB COMMISSIONING STUDIES FRIDAY, MAY 25, 1973

Bennett, Blumberg, Glasmann, Guthy, Keane, Levine

Scheduled: 0001-0800 Actual: 0500-0800

(Note: 5/24 studies 0-0800 were cancelled due to Linac P.S. failure)

Objectives: (1) Measure horizontal emittance at high AGS intensity.  
(2) Demonstrate capability for extraction out I10.

Results: (1) With AGS at  $9 \times 10^{12}$  ppp were inserted magnets. H10 magnet is an injection aperture with downstream end at 2.3" from B.C. axis. In operating position of 2.0" we decrease (early) CBM to  $8 \times 10^{12}$ . On flattop we had  $7 \times 10^{12}$  remaining. We had difficulties - first with RF turn-off which caused AGS beam to fluctuate, next with FEB power supplies. Drift in timing the firing of the 4 capacitor banks of C15 kicker prevented us from obtaining the 3  $\mu$ s 8000 A waveform which allowed full extraction on 5/22. There was qualitative evidence that at least one bunch of the many that appear on external current transformer per spill was fully extracted, giving us confidence that with proper kicker current we can fully extract at high intensity. It did not seem worthwhile to try emittance measurements with such erratic spill.

(2) There was no time to change H10 magnet polarity and try getting shaved beam to I10.

FEB Studies results and plans.

June 15 p. 9 E10 + H10 bump orbits. 40mm and 37mm respect.

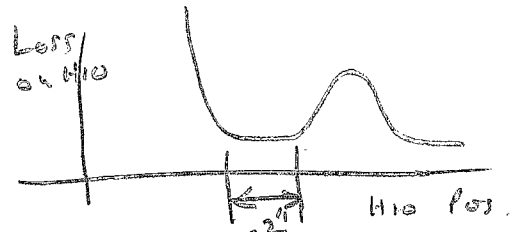
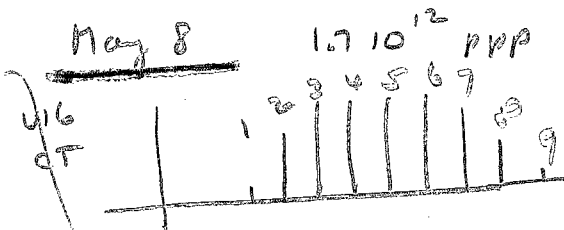
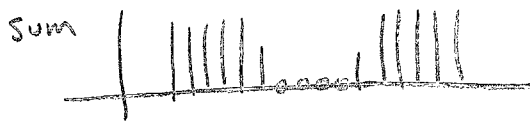
June 29 p. 16 CIS, EIS kickers.

Aug. 8 p. 21 Note vertical oscillation induced by kickers.

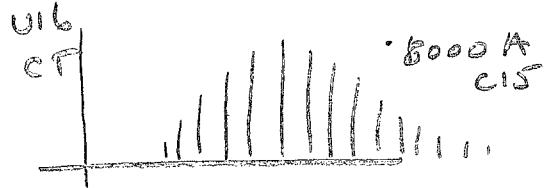
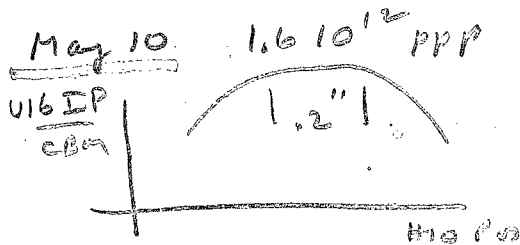
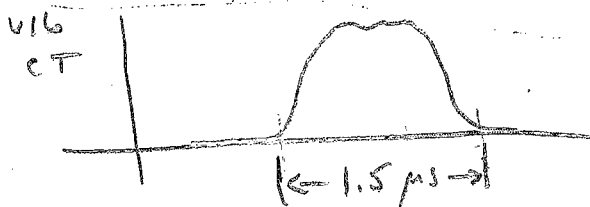
April 10  $V_v$  measurements. at  $E3 \approx 0$   $V_v \approx 8.65$ . No  $\Delta V_v$  from bumps, as expected.

Apr 26

May 1. with  $CBM = 4.7 \cdot 10^{12}$ , injection aperture at E10 is  $1.1''$  we extracted but didn't see spot on U16 flag.



post FEB loss observed.



May 16 vertical profiles.  $3.5 \cdot 10^{12}$  bunched. Still see post-FEB loss!

May 17 horizontal FEB.  $5 \cdot 10^{12}$  bunched.

May 22. FEB + SEB compatibility. Full extraction of  $4 \cdot 10^{12}$  bunched; using large CIS aperture banks.

MAY 25

saw that H10 is an aperture, starting with downstream at  $2.3''$  wrt BL axis

Notes on "measurements" loss 3 weeks after FEB

May 14

4/6/98