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#5 Attempt at H 10 Shaving Extraction. SUCCESS

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DISCLAIMER

NO. 24 FEB COMMISSIONING STUDIES MAY 8, 1973 Blumberg

Scheduled: 1800–0200 Actual: 2100–0230

From: Bagley, Bennett, Blumberg, Claus, Curtiss, Glasmann, Guthy, Keane, Raka, Schirmer, Soukas, Zguris.

Object: H10 BEAM EXTRACTION.

Result: Success

(1) We see external beam spot at H13 ~ 1/8" vertical × ~ .6" horizontal which is as expected with our usual assumption $E_H \approx E_V \approx .2\pi$ cm-mrad at 29 GeV/c. Spot 1700" downstream at test beam instr. box was harder to see but was ~ .75" dia. with UQ1 = 8.5 kG/in HF, UQ2 = 9 kG/in VF as expected. CBM ~ $1.7\ 10^{12}$ ppp Gaussclock = 57850

(2) External current transformer at H13 shows 4 bunches completely extracted, 2 bunches at about 75% intensity and a 7th bunch at ~ 1/3 intensity. This is in qualitative agreement with pick-up electrode in ring which shows 5 unperturbed bunches and a fraction of 2 more remaining in machine after extraction. We do not have quantitative result on efficiency yet. Above observations are with full strength of C15+E15 beam kickers (~6000A peak) and circulating beam parked about .050" from E10 septum before extraction. We previously estimated that kickers would give peak deflection of 1.2 cm at E10 so its surprizing that we can extract 4 bunches cleanly. Beam size must be < 1 cm on flattop. This is not inconsistent with J.C. Herrera 4/25/73 measurements showing high field vertical size of 1 cm at higher (4–4.9 10^{12}) internal beam.

(3) Turned off RF early to test shaving of de bunched beam. It works fine. Spill duration is ~1.5 μsec with negligible rf structure.

(4) Obtained an approximate idea of clearance at H10 by moving magnet and observing loss on insulated plate. We have at least .150" clearance at thin (.09") septum.

(5) Only difficulty is an intermittant loss of remaining AGS beam at 3 msec after FEB extraction. Symptom is rapid radial excursion to inside of ring. The loss was apparent at low (~1×10^{12}) intensity and went away at $1.7\ 10^{12}$, suggesting that radial signal is too small after FEB to hold beam position. However, loss reappeared at $1.7\ 10^{12}$ when we reduced C15+E15 kickers.

EFFECT IS NOT UNDERSTOOD.