

1.5 GeV/c multi-turn FEB extraction at maximum intensity

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OBSERVATIONS AND CONCLUSION

- Objectives: (1) Measure H and V emittance with U167 SEM, U186 beam plug closed,
(2) Transport beam to production target and observe background in Exp. 613 detector.

- Set-ups: (a) C15 and E15 kickers ~ 1000 A peak, 30 μ sec half-sine
(b) E10 and H10 bumps ~ 20 A peak, 7 ms half-sine
(c) H10 ejector ~ 900 A peak, ~ 1.4 msec half-sine
(d) E10 septum ~ 150 A peak, 200 μ sec half-sine
(e) AGS: extraction time 106 ms, Gauss clock ≈ 2940 , CBM $\approx 5.5 \cdot 10^{12}$ at 80 ms

- (1) Maximum extraction was $\approx 45\%$, similar to 2/2/77 run (Studies Note 82). Three-turn (~ 34 bunches) observed from U165 analog current transformer. Optics for vertical waist setup as predicted from beam code internal emittance parameters α_v and β_v at H10 plus beam code transport matrix H10 \rightarrow H13. Calculated quad strengths ($G \times l_{eff}$) were $Q_1 = 16.35$ kG, $Q_2 = 17.19$ kG, $Q_{3 \rightarrow 7} = 5.43$ kG (B polarity). Vertical minimum at U165 flag was very small (several mm) as predicted. We stepped the single wire U167 SEM through beam but obtained no signal for vertical profile. Horizontal profile appeared satisfactory so we changed polarity of $Q_{3 \rightarrow 7}$ to obtain horizontal waist at U165 flag. Horizontal drift in spot position made emittance measurement hopeless. Drift was correlated to change in H10 Datacon readback. H10 EM stability improved when we switched to local operation.
- (2) Calculated optics for transport to production target were setup. Beam scraping on vacuum pipe upstream of U165 and U303 (first flag downstream of 8°) observed. Some beam observed on U380 flag, but not on radiation monitors downstream of 8° . Radiation monitors #3, 6 and 9 (end of 4° bend, U165 instrument box and downstream of Q7 respectively) indicated large losses.