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Beam Tuning with low Field Corrections

J. Herrera

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Collider Accelerator Department

Brookhaven National Laboratory

U.S. Department of Energy

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J Herrera, MJ Barton

This time was spent in checking various low field corrections and tuning the beam with various combinations. First, the β-quads were set to approximately the value calculated previously (rather than arbitrarily tuned). This setting corresponds to -500 on computer display for the #2 and #8 quads and +500 on #12 and #18. (These polarities are, by the way, just backwards). The backleg ν-shift ~~coils~~ circuits were turned off. These should no longer be needed with all the other available ν-shift quads. Machine was tuned to a ν-value of $\nu_v = 8.78$, $\nu_H = 8.65$. Tuned machine to about 5.5×10^{12} on early monitor and 4.3×10^{12} late. Later checked ν shift from each of the β windings separately. Found $\Delta\nu$ ~ consistent with theory for #2's and #8's. but no consistent results with 12's & 18's. The polarity of each quadrupole should be checked and the computer displays corrected to make these all consistent.

Ran slightly different set of corrections on QVC3, QVF3, QVI3 QVL3. The primary role of these quads should be to correct vertical 170 gradient term. Indeed found that by retuning these so that only 170 present, i.e. QVC3 = -QVI3 etc. no deterioration of beam resulted. However, if the beam was tuned to $\nu_v \cong 8.5$, and the stopband explicitly tuned

with these quads, the settings are different and do not result in particularly good beam when the V value set back to reasonable value.

This study period points out the need to sort out many trivial computer system problems.

1. all polarities and circuit designations, labels, etc. must be correct and procedures established to keep them that way.
2. Service programs like OENU, LOWHN, LOWVN etc. must be corrected, serviced, and documented.
3. There is a significant need for more equipment on the computer. These are the remainder of the low field corrections and the new pickup electrodes. The electrodes are primarily needed for closed orbit correction. There is some evidence that a closed orbit correction is overdue but the limited observations of the remaining electrodes do not permit a good fit of this.