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Affect of Upstream FEB Magnets on AGS Beam Intensity

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Subject Affect of upstream FEB magnets on AGS beam intensity.

OBSERVATIONS AND CONCLUSION

Magnets UP1, UQ1, UQ2 and UD1→ 3 were varied. The affect on the AGS beam was noted by readout of 10 pulses of the early CBM scaler (t_{read}=100 ms) with early rf turnoff (t_{off} = 200 ms). The average circulating beam per pulse is tabulated below for various combinations of magnet on-off conditions. Magnet excitations are in DATACON readback units. The pulse-to-pulse fluctuations in the CBM was measured as ± 1.3% rms.

UP1	UQ1	UQ2	UD1→ 3	CBM (/10^{12})
1595	2668	3341	3010	9.53
1104	2668	3341	3010	9.56
1587	OFF	3339	3010	9.08
1588	2675	OFF	3010	6.78
1579	OFF	OFF	3010	2.74
OFF	OFF	OFF	3015	5.82
OFF	OFF	3340	OFF	9.09
OFF	2675	OFF	OFF	8.78
1584	OFF	OFF	OFF	5.59
OFF	OFF	OFF	OFF	6.84

We conclude from the above data that the FEB magnets have a large affect on beam intensity. Their affect is presumably corrected for by the existing low field correction magnets. UQ1 and UQ2 together decreased the beam by more than a factor of 3. The intensity appears to be more sensitive to UQ2 than to UQ1. Magnets UP1 and UD1→3 appear to compensate somewhat the affect of Q1 and Q2. Horizontal and vertical orbits were taken with UQ1 and UQ2 off and show an orbit oscillation of ~ ± 1 mm amplitude. With the magnets on, no orbit deformation is seen. We noted that magnets UQ1 and UQ2 are near (~ 2 ft.) straight section H15 which at present is unoccupied. We recommend that magnetic shielding be installed in this straight section. The magnitude of the stray field was not measured.