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E15 Kicker for 9H Measurement. Bunch Shape Osc.

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The F-15. Lykes was pushed to 10K vane' used to attempt to measure horizontal Q values at 500 msec (≈ 215 m/s). Because the pulse width was > 1 revolution period and contained some oscillation the resulting coherent betatron amplitude oscillations were barely adequate to obtain the (Q-Q) frequency. Hence the error was large. Coupling to the vertical motion also complicated the results.

The bunch shape oscillations excited before transition were compared to intensity dependent c.e. at $\approx 2 \times 10^{12}$ no damping is needed until at 10^{12} the available damping is not always sufficient. The rate of change is greatest in the neighborhood of the amplitude dip position. The high level R.F. Raising the clamp level but not the amplitude tends to make the excitation greater at the high intensity. Lowering the amplitude appeared to help but this is not certain. The reason for the excitation is obviously a complex interaction between beam, cavities and servo loops.

With $\approx 6 \times 10^{12}$ transition was passed using a double phase jump and clamped radial signal. Transition loss was consistently $< 0.5\%$ while with the standard single jump and no clamp the range was $.7 - 1^+ \times 10^{12}$.

With $3-4 \times 10^{12}$ transition ^{passage} with "no loss" was set up using the single jump amplitude phase jump & outward radial expansion. The beam radius at 0.6β was swept over the range of -6 to $+7$ mm at $t = 7$ from 300 μ sec to 50 msec. The horizontal instability seen previously at $t = 7$ $+1$ to $+4$ mm was not present and was the only 300-350 msec vertical ~~the~~ dipole instability (seen at $t = 2$ and present). One did see a vertical dipole instability, generally uncoupled bunch mode, starting at 400-450 msec and peaking around 500 msec. over the range of $+2$ to $+6$ mm and -1 to -3 mm. Note that there were no SE Bor FEB magnets in position. Also since the absent instabilities were last observed (on 3/15) the G-20 RBD has been removed.