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E15 Kicker for 9H Measurement. Bunch Shape Osc.

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The E-15 kicker was pulsed & 10K rad'l used to attempt to measure horizontal Q values at 500 msec (≈ 21 GeV/c). Because the pulse width was > one revolution period and contained some ripple, the resulting coherent betatron oscillations excited were barely adequate to obtain the (9-Q) frequency. Hence the errors were large. Coupling to the vertical motion also complicated the results.

The bunch shape oscillations excited before transition were confirmed to be intensity dependent i.e. at ≈ 2×10^{12} no damping is needed while at 5×10^{12} the available damping is not always sufficient. The excitation is greatest in the neighborhood of the amplitude dips present in the high level RF. Raising the damp level behind the amplitude dips 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 ≈ 6×10^{12} transition was passed using a double phase jump and damped radial signal. Transition loss was consistently < $.8\times10^{12}$ while with the standard single jump and no damp the range was $.7 - 1^{+}\times10^{12}$.

With $3-4\times10^{12}$ transition passage with "no loss" was set up using a single low amplitude phase jump & outward radial excursion. The beam radius at β_{min} was swept over the range of -6 to +7 mm at H-7 from 300 to 650 msec. The horizontal instability seen previously at H-7 +1 to +4 mm was not present nor was the old 300-350 msec vertical dipole instability (seen at 0 to -2 mm) 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 SEB or FEB magnets in position. Also since the absent instabilities were last observed (on 3/15) the G-20 RBD has been removed.