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Split tune operation of a hybrid booster lattice ?x = 3.820, ?y = 4.830

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$\nu_x = 3.820, \nu_y = 4.830$

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$\nu_x = 3.820$, $\nu_y = 4.830$

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Abstract

A comparison is made between operating the hybrid Booster lattice at $\nu_x = 3.830$, $\nu_y = 3.820$ and $\nu_x = 3.820$, $\nu_y = 4.830$. The coupling reported previously at $\nu_x = 3.830$, $\nu_y = 3.820$ is considerably reduced, but indications of effects from the 3rd order structure resonance are still apparent in the horizontal motion.

1. Tracking results for a hybrid Booster lattice[1] operating at $\nu_x = 3.830$, $\nu_y = 3.820$ show pronounced coupling and indications of the 3rd order structure resonance .[2]

2. Tracking of the standard combined function Booster lattice[3] shows reduced coupling when the horizontal and vertical tunes are split by one unit.[4] In this note the effects of splitting the tune of the hybrid lattice are reported. Tune selection is based on $\nu_x = 3.820$ being particularly favorable for injection.

Tracking results including the effects of injection eddy current multipoles[5] are shown in Fig. 1 for $\Delta P/P = 0.0\%$. In Fig. 1(a) appear the previously reported results for $\nu_x = 3.830$, $\nu_y = 3.820$, and in Fig. 1(b) are the results obtained at $\nu_x = 3.82$, $\nu_y = 4.830$. Coupling has been reduced; the phase plot for the vertical motion shows no sign of a resonance, while the phase plot for the horizontal motion is still distorted by the 3rd order structure resonance. While improved by splitting the tune, $\nu_x = 3.820$ may still be too close to the structure resonance at $\nu_x = 4.00$.

References

1. J. Claus and S.Y. Lee, private communication.
2. G.F. Dell, Booster Tech Note #37.
3. E. Courant and Z. Parsa, Booster Tech Note #1.
4. G.F. Dell, Booster Tech Note #39.
5. G. Morgan and S. Kahn, Booster Tech Note # 4.

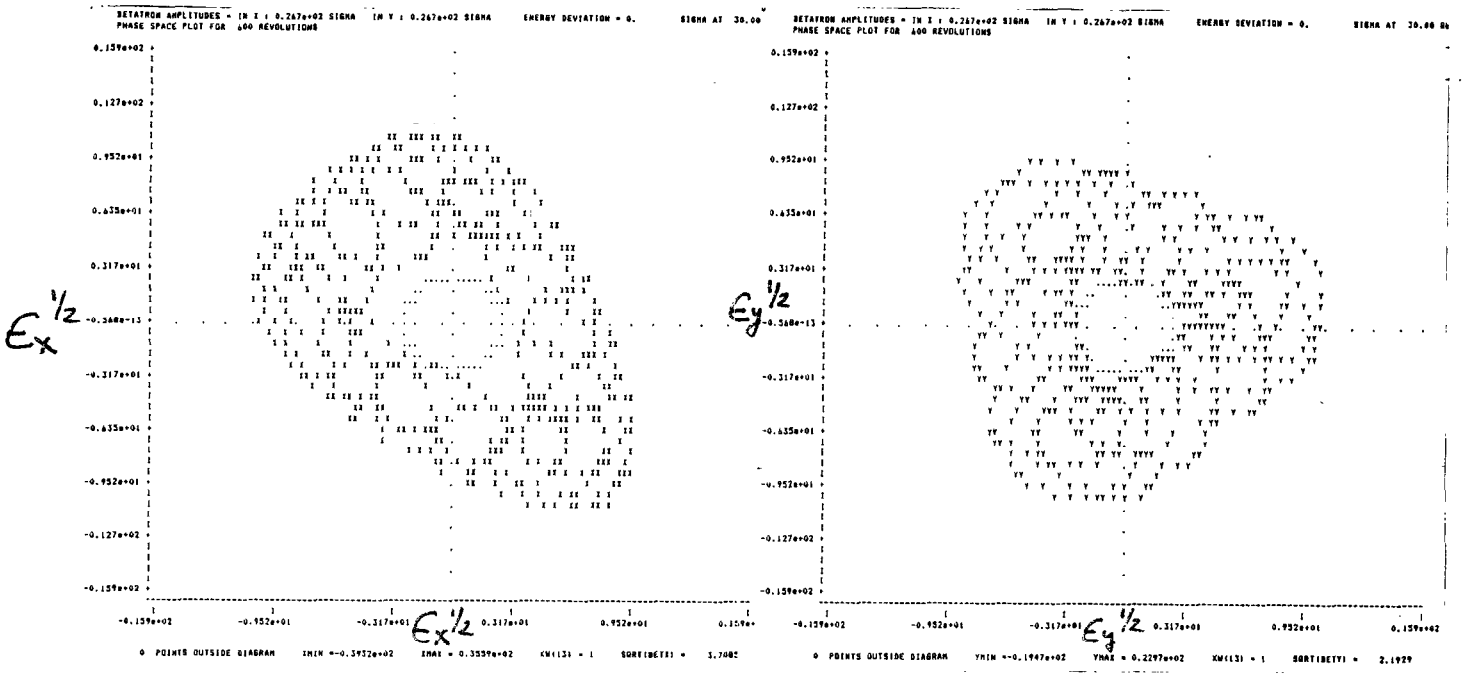

Fig. 1(a) Hybrid lattice, ν_x = 3.830, ν_y = 3.820, With eddy current multipoles. Δ P/P = 0.0%, Chromaticity = 0.0 in both planes, $\epsilon_x = \epsilon_y = 50\pi$ mm mrad.

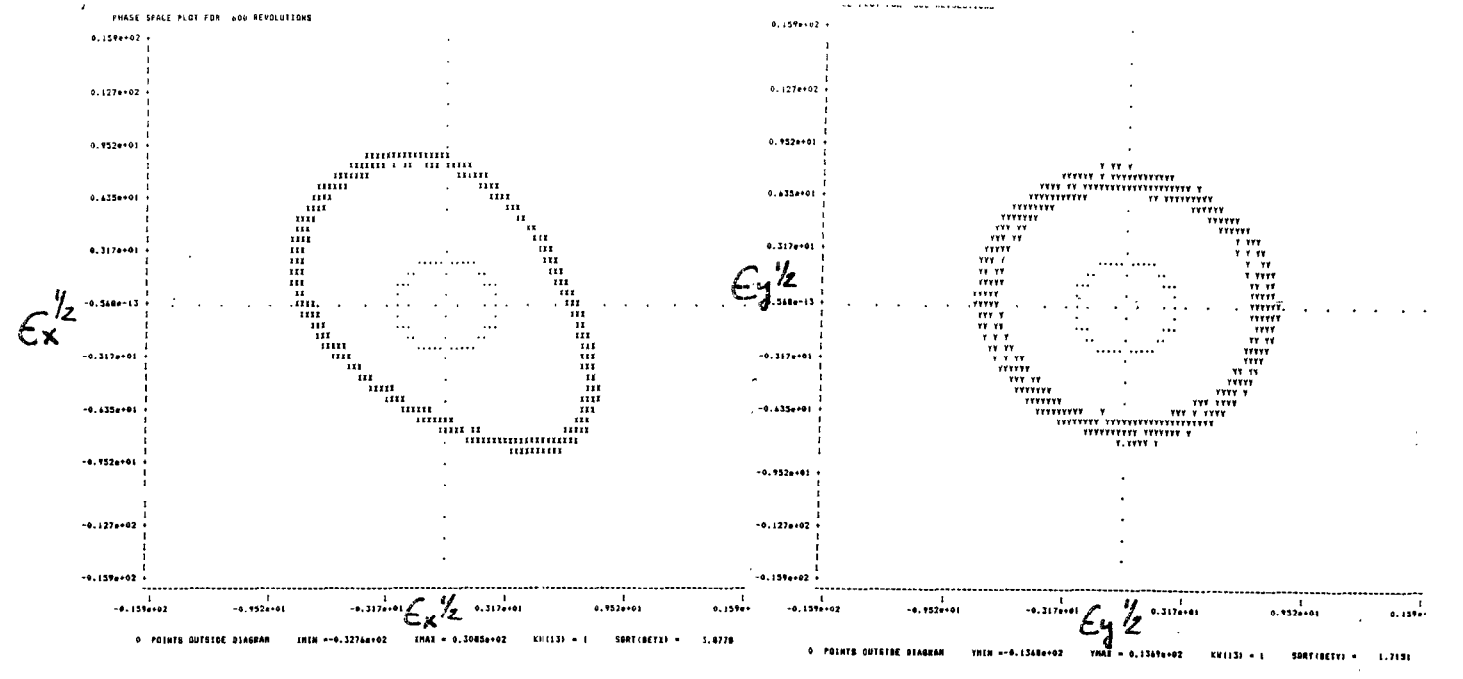

Fig. 1(b) Hybrid lattice, ν_x = 3.820, ν_y = 4.830, With eddy current multipoles. Δ P/P = 0.0%, Chromaticity = 0.0 in both planes, $\epsilon_x = \epsilon_y = 50\pi$ mm mrad.