Modeling Tune Shifts from Sextupole Offsets using CesrV

$$\frac{qL}{P_0} B_{\mathrm{Y}} = \mathrm{K}_2 L \left(\mathrm{x}^2 - \mathrm{y}^2\right)$$

$$\frac{qL}{P_0} B_{\mathrm{X}} = 2\mathrm{K}_2 L \, \mathrm{x} \, \mathrm{y}$$

$$b1 = \frac{1}{2!} \frac{qL}{P_0} \frac{\mathrm{d}B_{\mathrm{Y}}}{\mathrm{dx}} = \mathrm{K}_2 L \, \mathrm{x}$$

$$a1 = \frac{1}{2!} \frac{qL}{P_0} \frac{\mathrm{d}B_{\mathrm{X}}}{\mathrm{dx}} = \mathrm{K}_2 L \, \mathrm{y}$$

Jim Crittenden
Bazarov/Rubin group meeting
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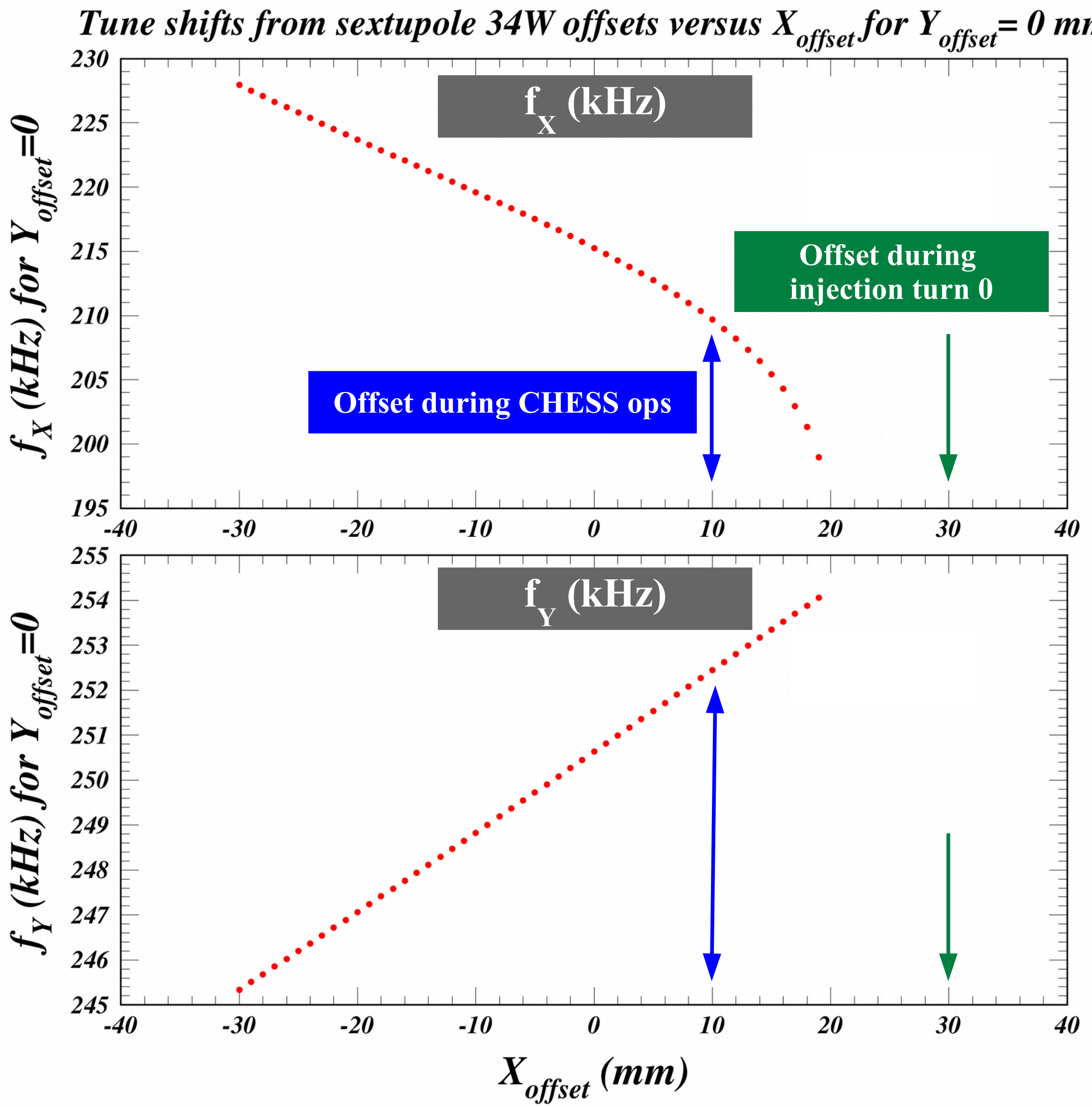
Sextupole 34w: tune shifts vs X_{offset}



Use CESR optics model obtained with a optimization to a measurements of phase, orbit and coupling in a recent phase file (29151) using steerings, quads and skew quads.

Sextupole 34w: 7495 cu → K2L = 0.313 m^{-2}

β_X = 51 m β_Y =18 m for zero offset

β_X = 76 m β_Y =18 m for X_{offset} = 10 mm

The horizontal tune shift due to the horizontal offset is about -5 kHz.

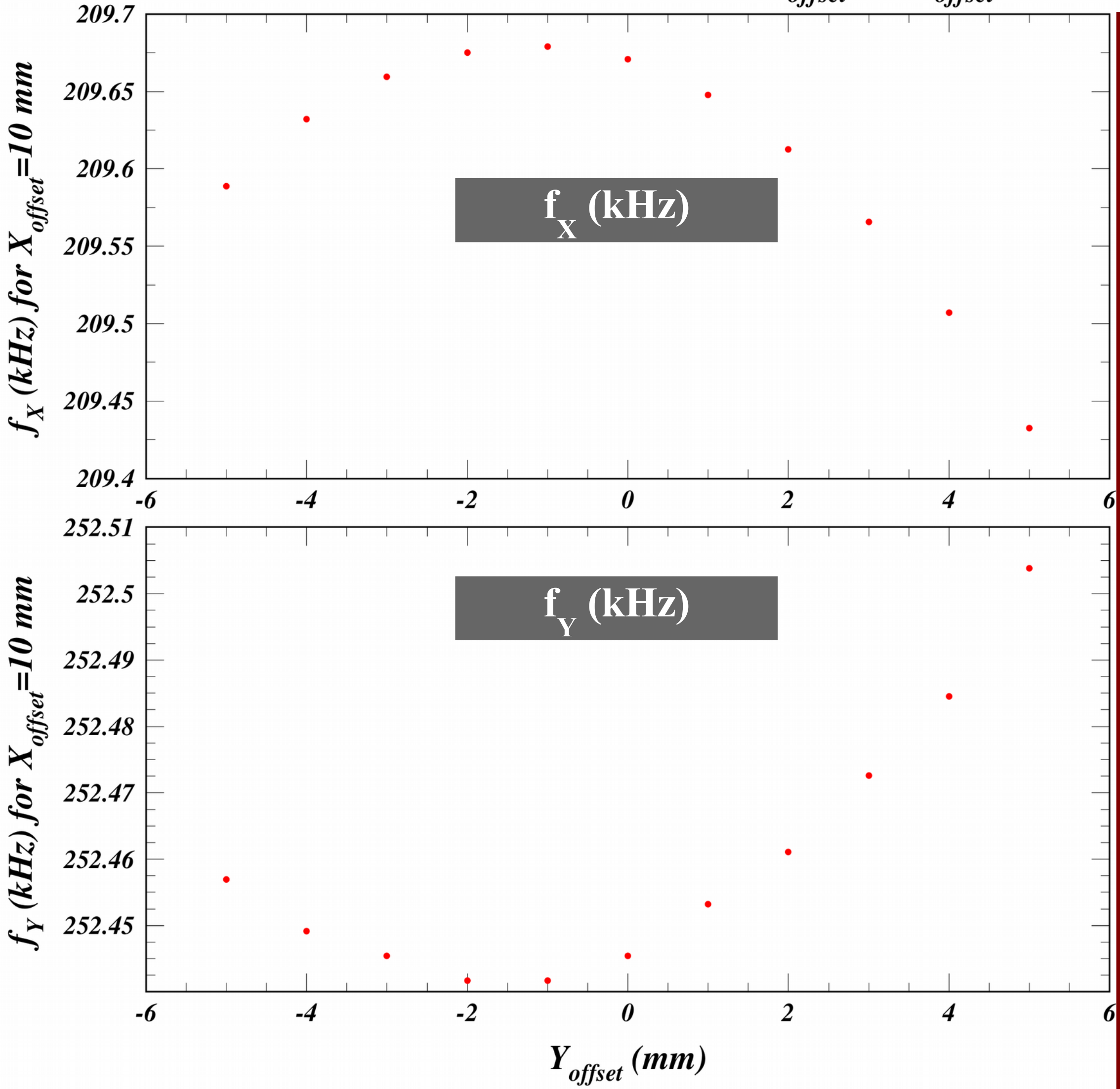
The vertical tune shift due to the horizontal offset is about +2 kHz.

The tune shift during injection turn 0 is large enough to cross the half integer!

But this is just 34w. Do we have a way to put the turn 0 trajectory into a CesrV model so we can see the tune shift from the entire ring?

Sextupole 34w: tune shifts vs Y_{offset}

Tune shifts from sextupole 34W offsets versus Y_{offset} for X_{offset} = 10 mm



On 13 January SW and VK reduced the vertical beam position at 33W from +3 mm to +2 mm (elog 1984).

The horizontal tune shift due to the 2-mm vertical offset is about -0.05 kHz.

The vertical tune shift due to the 2-mm vertical offset is about +0.015 kHz.