APEX21 PREPARATIONS
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RADIAL SHIFT STUDIES

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I – Progress

- With the recent development to the 26 GeV ramp needed for CeC commissioning during Run21, our group has been following along and worked on using both the *injection* and *store* stones of that ramp for Radial Shift.

- Still in the spirit of taking the most cautious approach possible, and in order to not disrupt the flow of the low energy physics program, we have been focusing on the injection setup of the Yellow lattice at 7.3 GeV.

- We are still working out the details on how to best control the RF and feedback systems to follow along the new magnet strengths that will be sent to achieve the expected radial shift: the main parameter that is needed is the change in circumference ΔC ”translated” into a new revolution frequency f_{RF}.

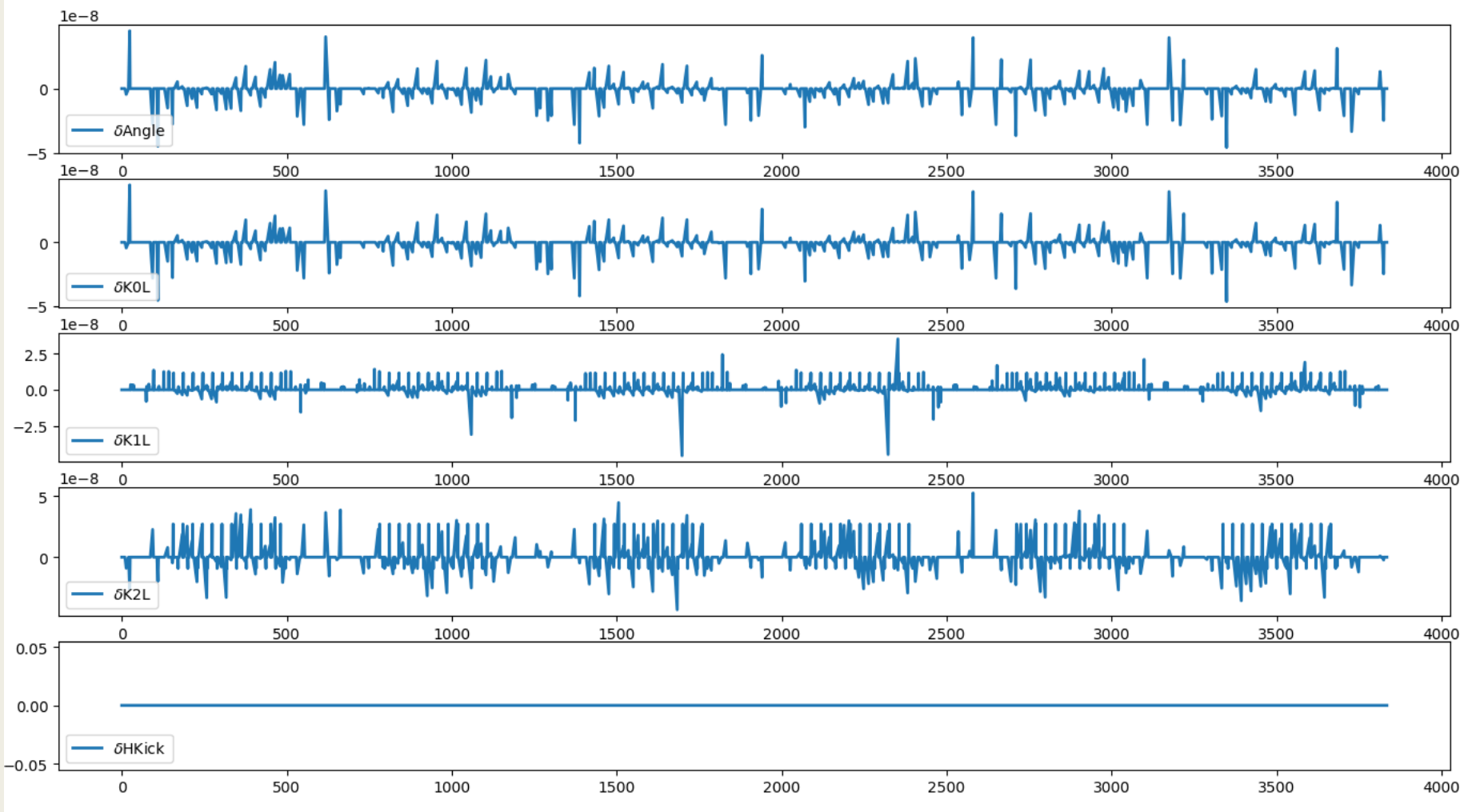
- A dedicated ramp file starting from Au21-26GeV::injection is being built, with various settings available for the end stone: our current plans call for sending dB/B values ranging from +/- 1% of the dipole field, however this will be done in steps to make sure to not shower the Yellow mechanical aperture.

- Recent changes to the collimation system are forcing us to be extra cautious…

- Left to be done: (1) generate a ramp file; (2) compare the expected beam size at store with aperture; (3) calculate the required settings for RF.

II – Handshake between codes

- Before the strengths calculated by our online models can be sent to RampEditor, we make sure that both codes being used (BMAD and MAD-X) have a strong agreement between them:



=> relative errors in strengths (bends, quads, sextupoles & orbit correctors) are at the 1e-8 level, practically identical!

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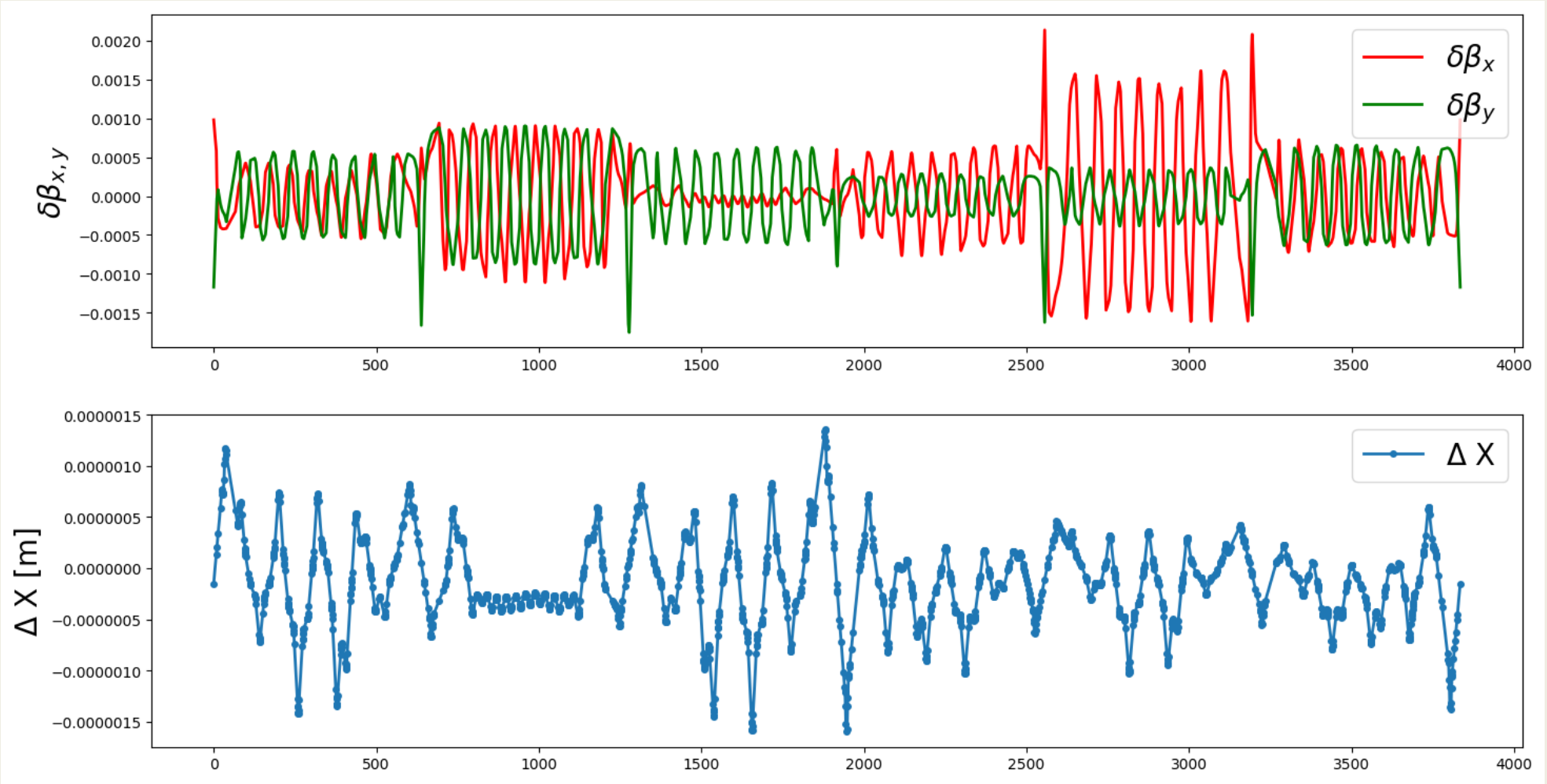

=> relative errors in linear optics is 0.2%; difference in expected closed orbit is at most 1.5 μm.

=> these results give us confidence that the machine will be very close to what is being designed!