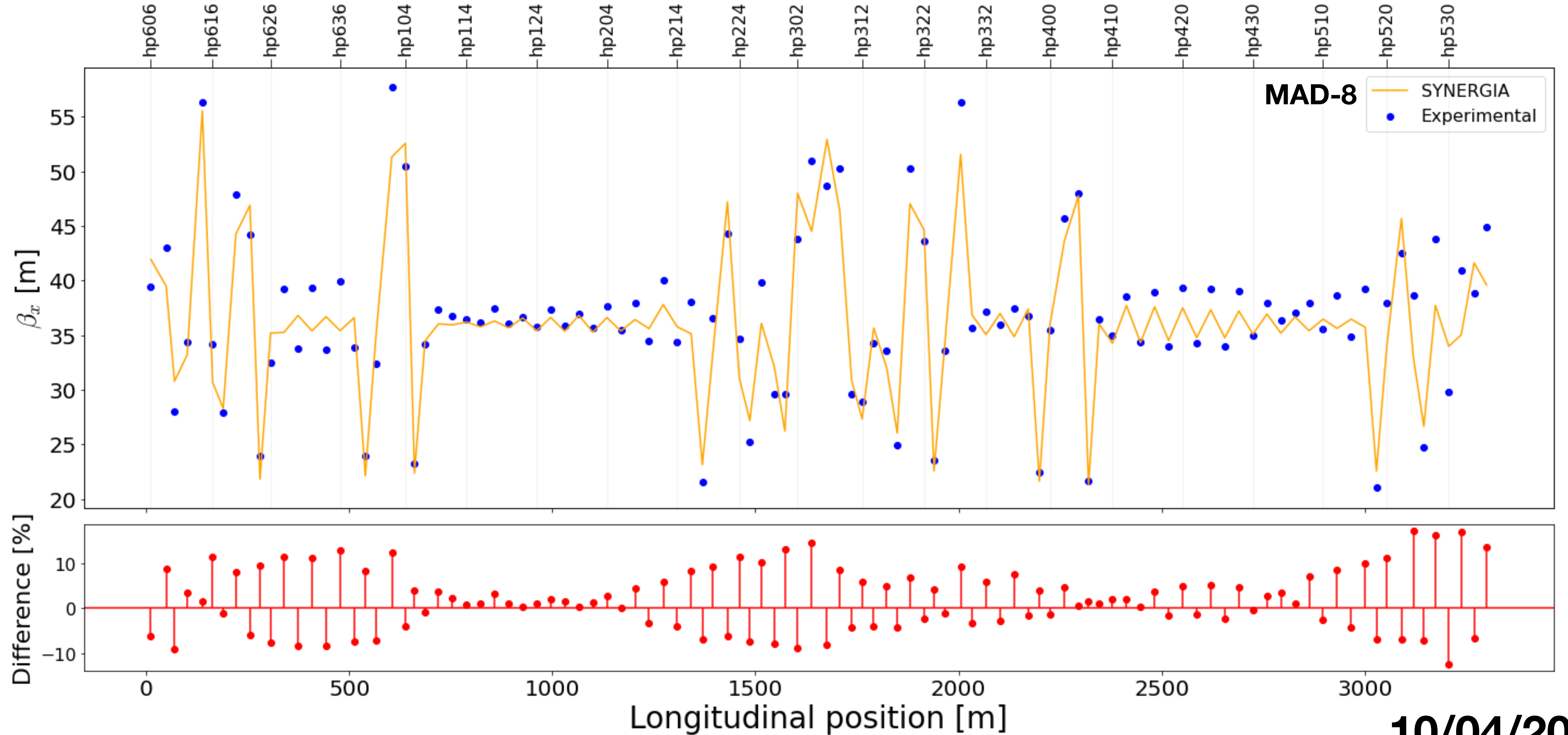


MY FIRST LATTICE AND COUPLING RESONANCE STUDIES AT THE RECYCLER

Cristhian Gonzalez-Ortiz
MI Department Meeting
October 13, 2021

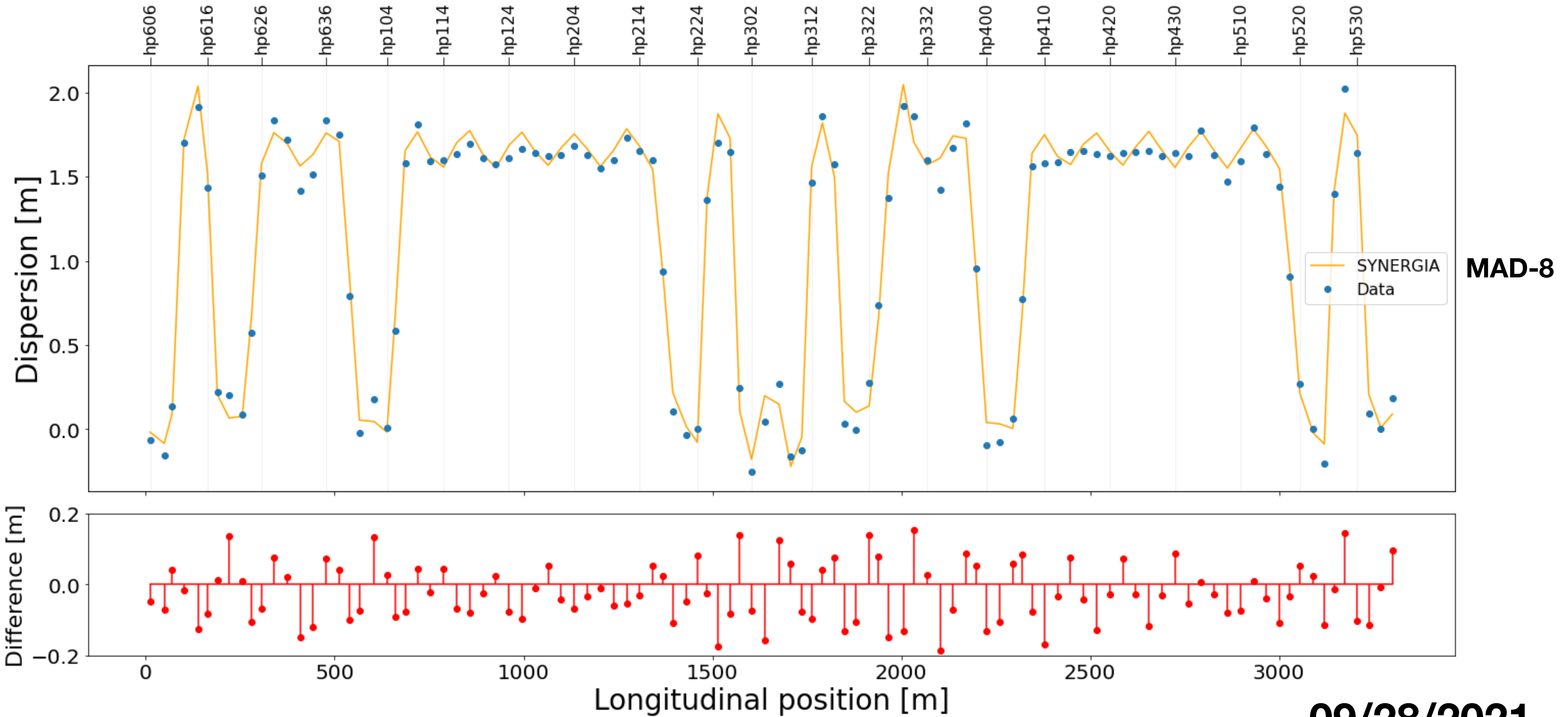
Beta functions (ON-MOMENTUM)

Measurement 0 in rre0_CG_OM_100421.tbt



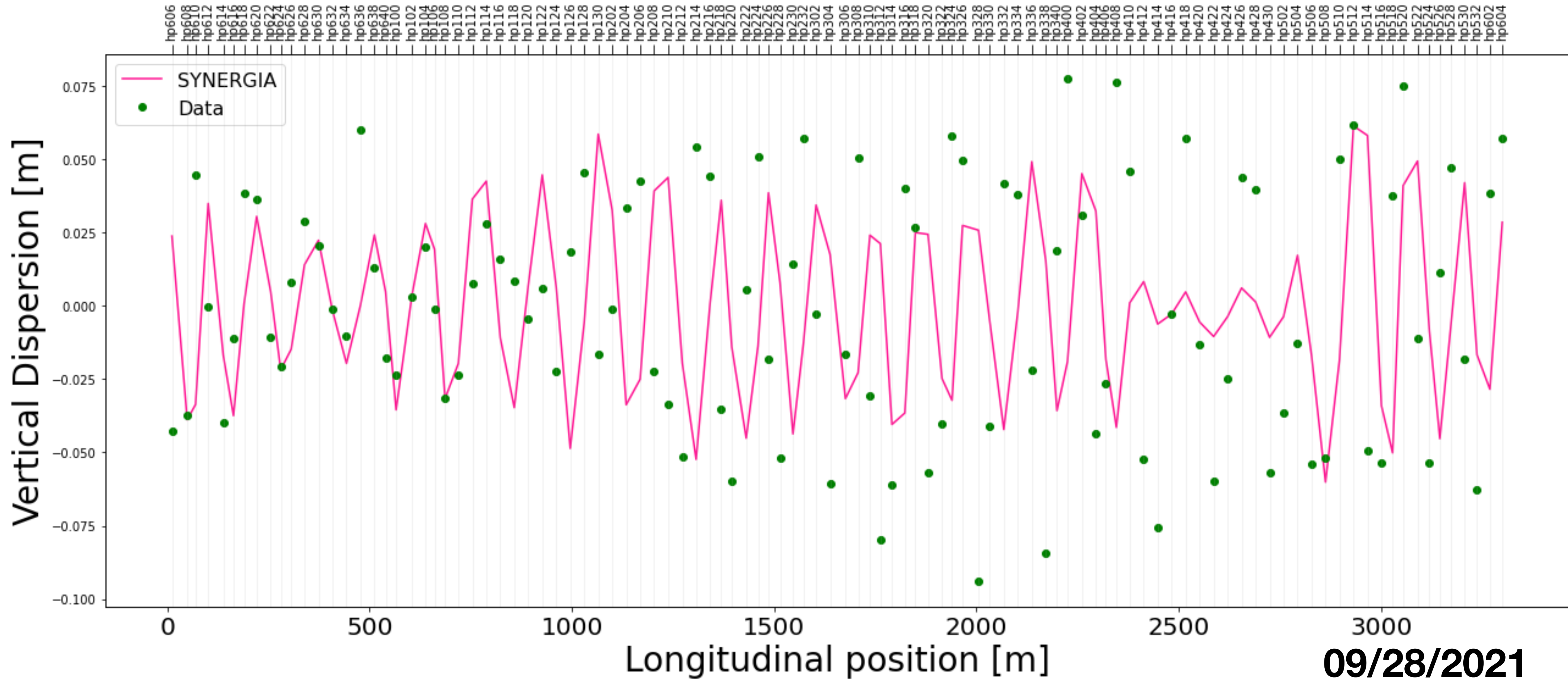
10/04/2021

Dispersion functions (ON-MOMENTUM)

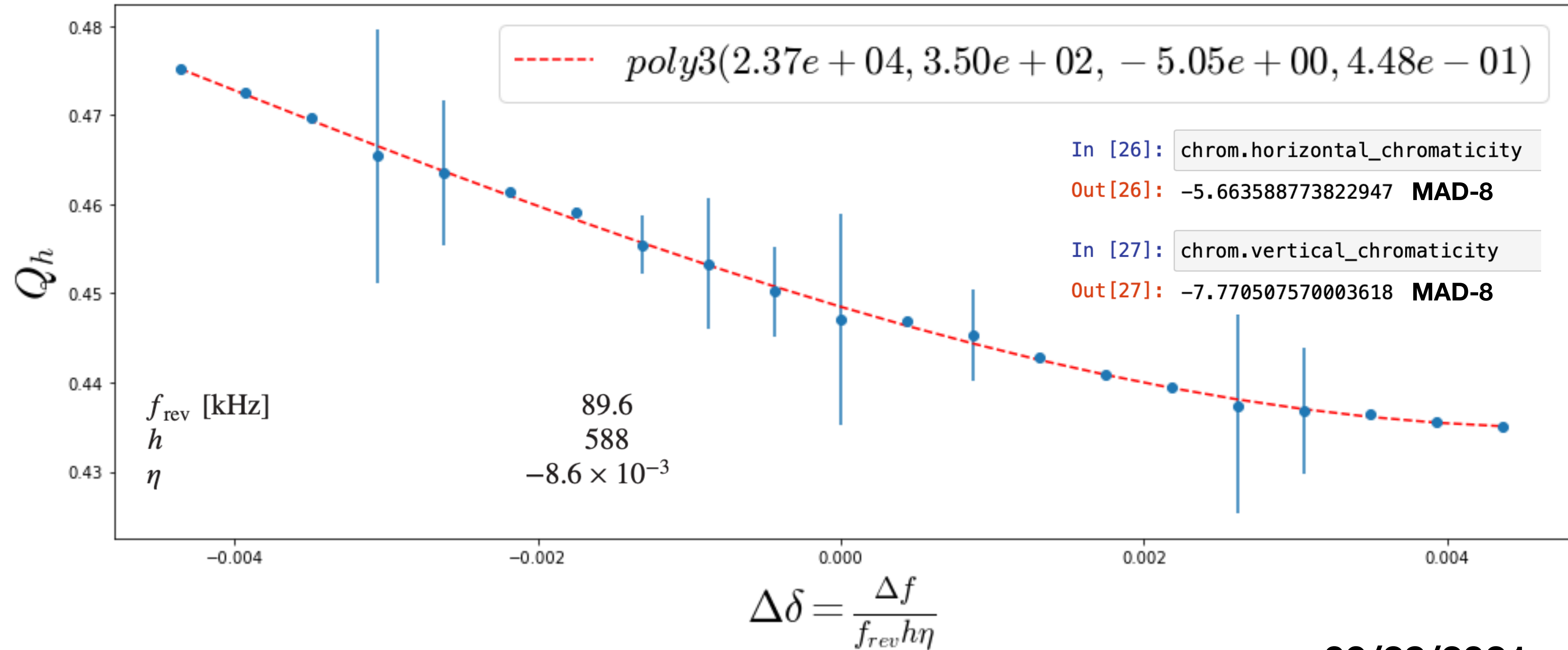


09/28/2021

Dispersion functions (ON-MOMENTUM)



Horizontal Chromaticity Measurement (ON-MOMENTUM)



09/28/2021

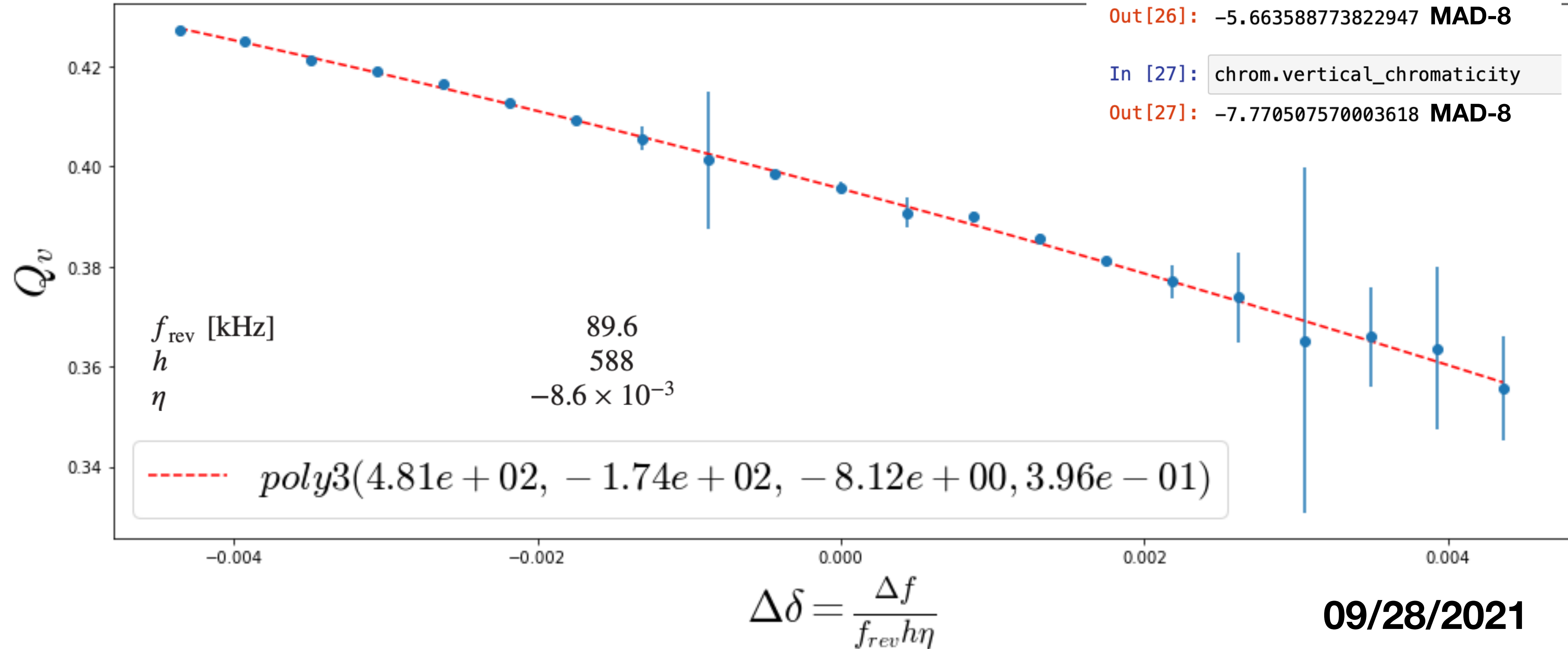
Vertical Chromaticity Measurement (ON-MOMENTUM)

In [26]: chrom.horizontal_chromaticity

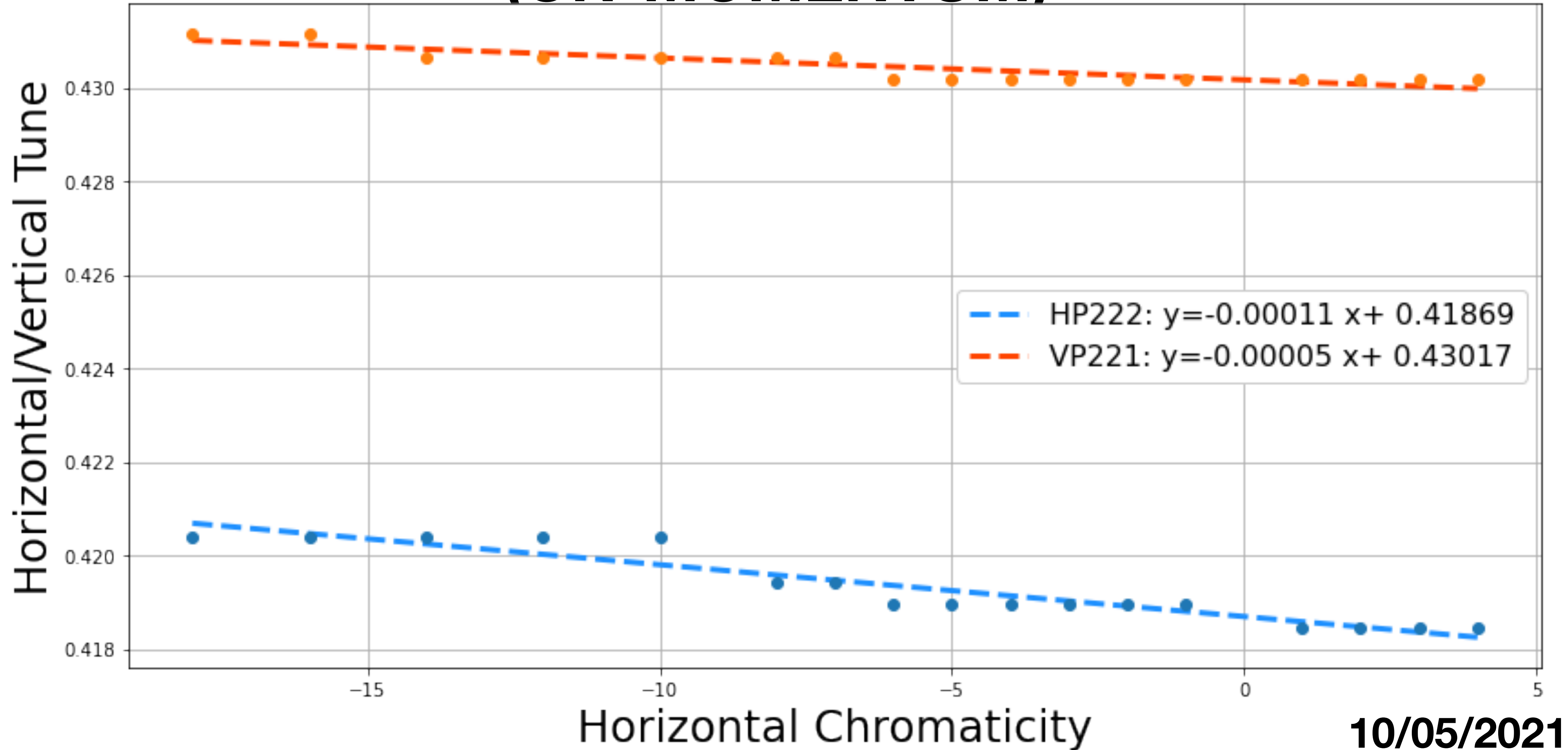
Out [26]: -5.663588773822947 **MAD-8**

In [27]: chrom.vertical_chromaticity

Out [27]: -7.770507570003618 **MAD-8**

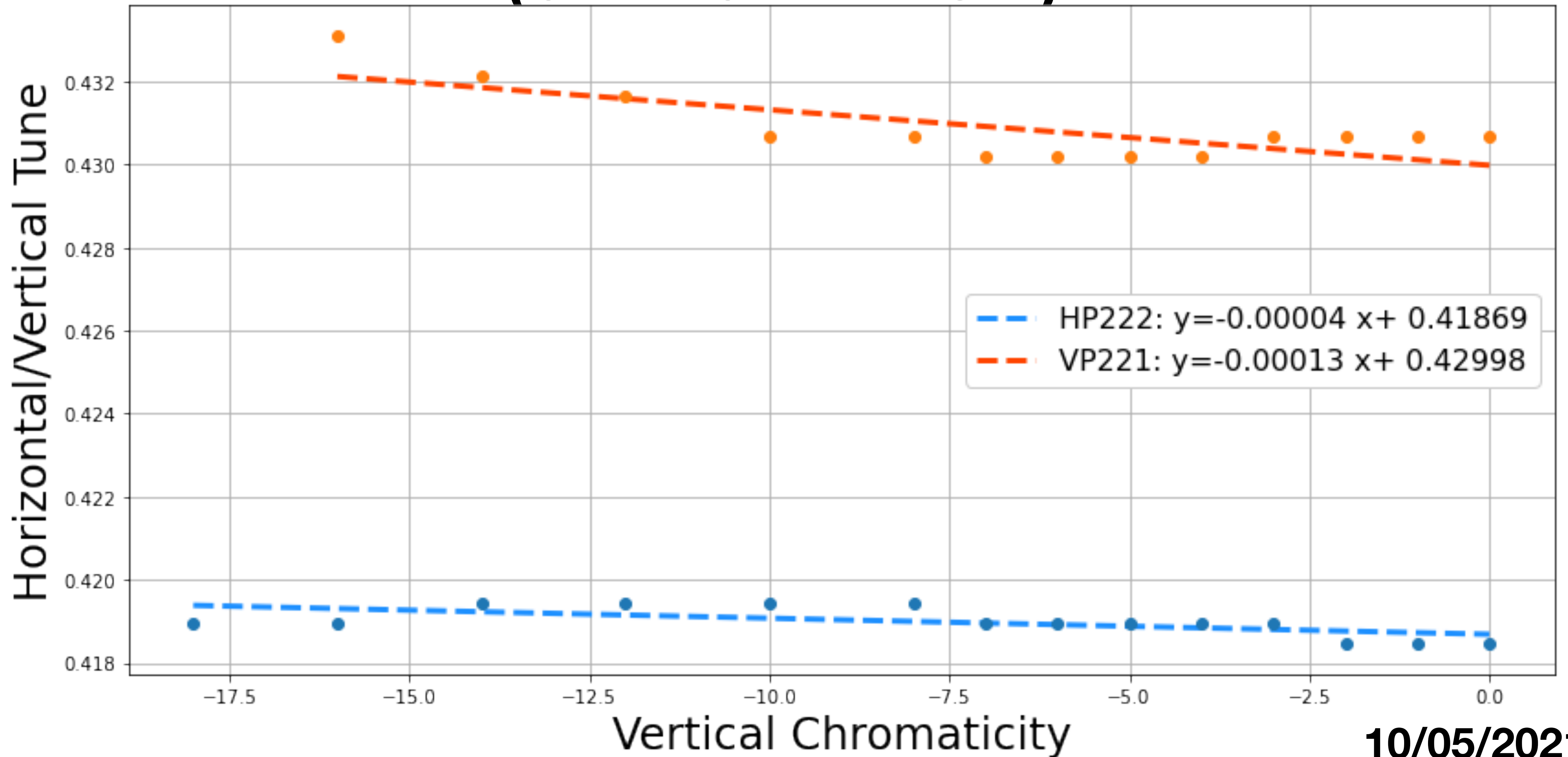


Sextupole-Quad Feeddown (ON-MOMENTUM)



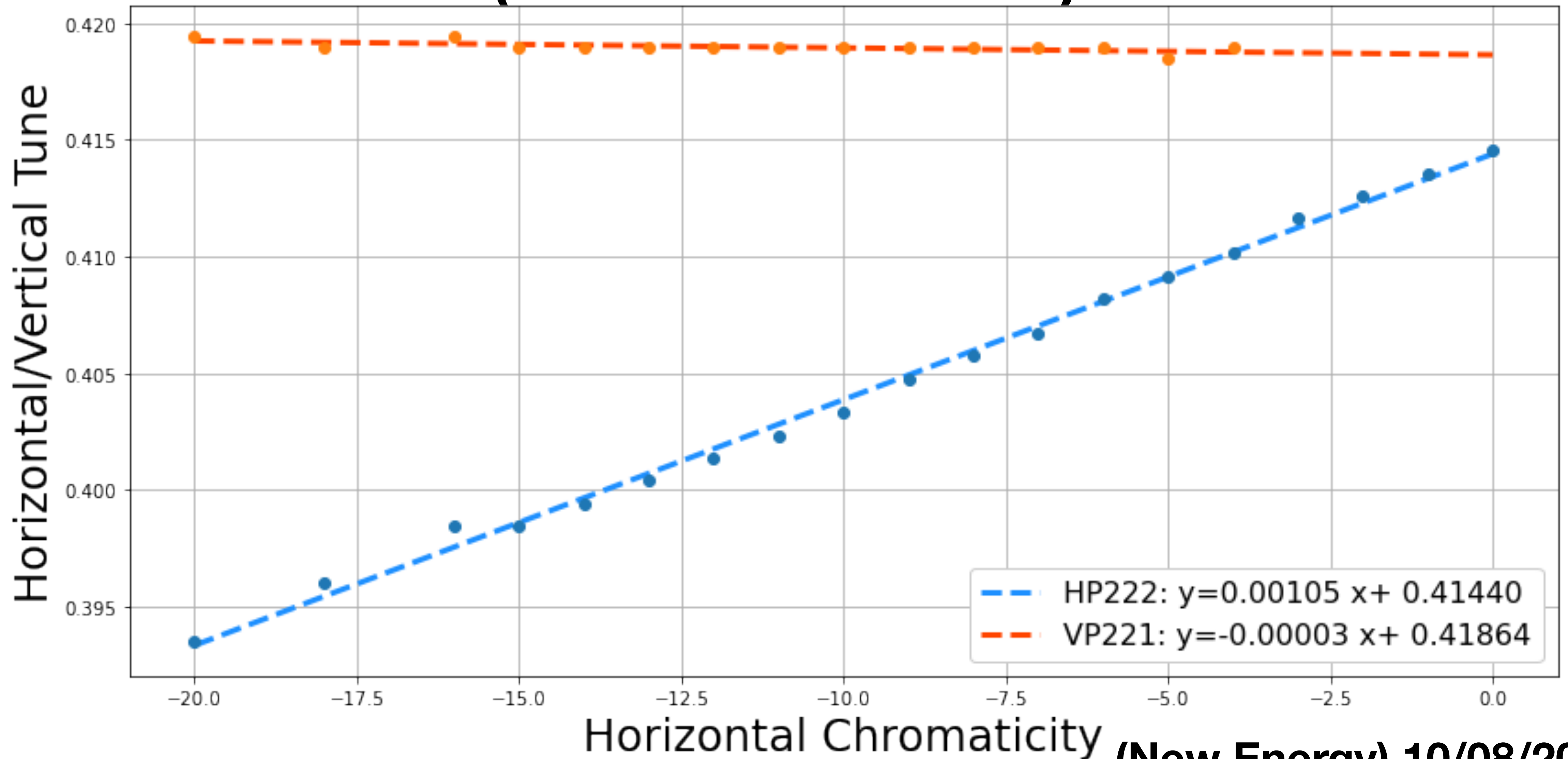
10/05/2021

Sextupole-Quad Feeddown (ON-MOMENTUM)



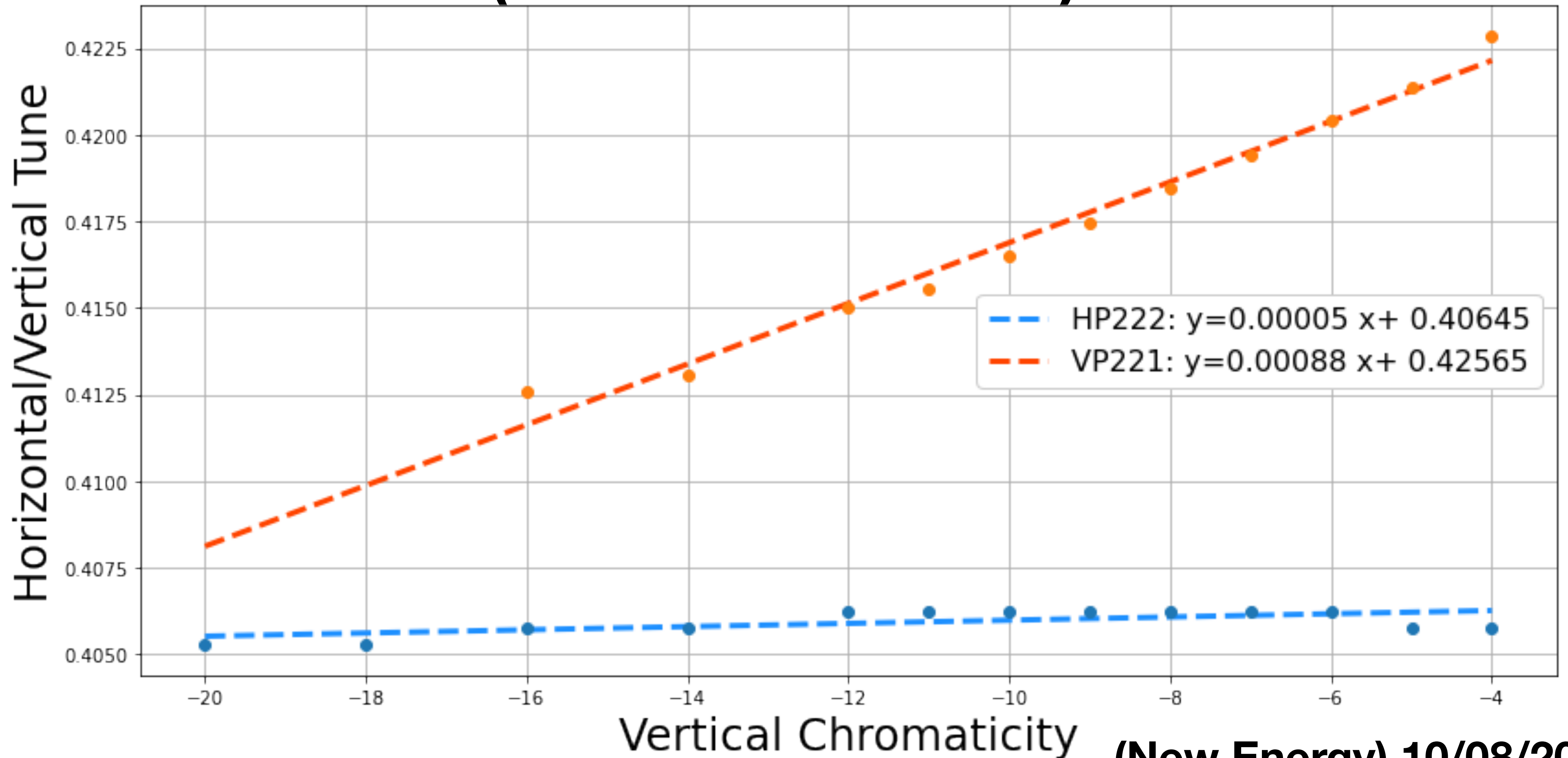
10/05/2021

Sextupole-Quad Feeddown (OFF-MOMENTUM)



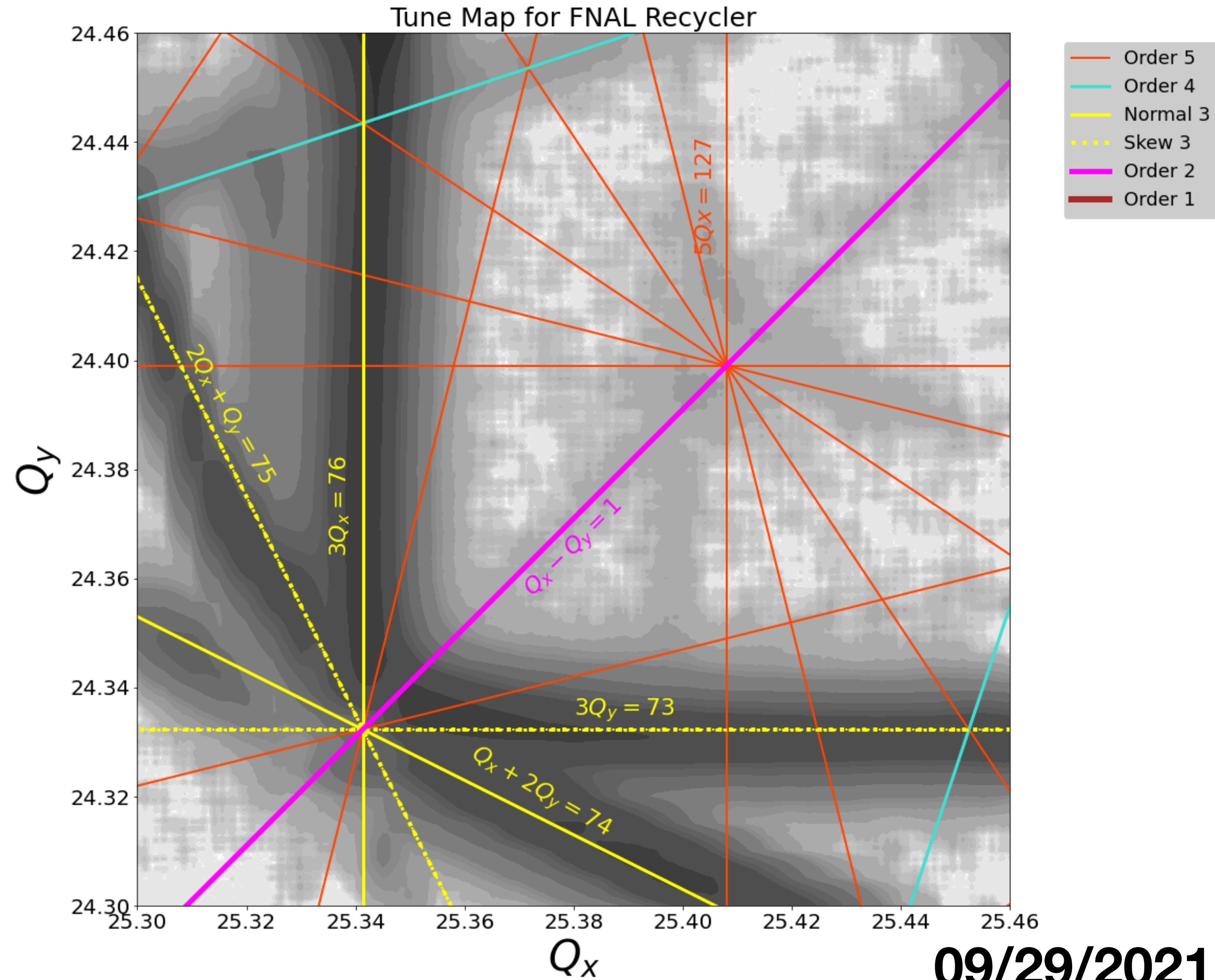
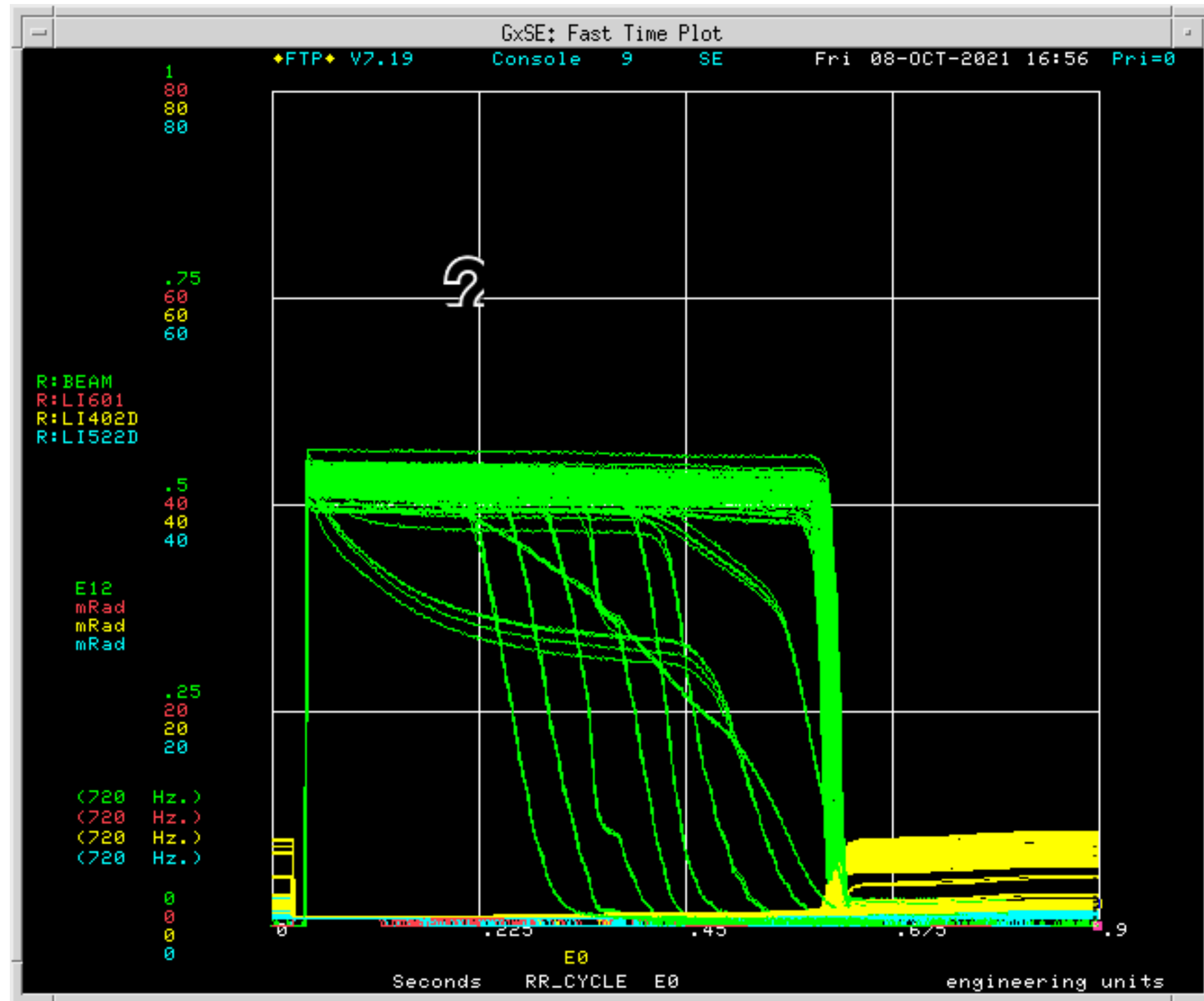
(New Energy) 10/08/2021

Sextupole-Quad Feeddown (OFF-MOMENTUM)



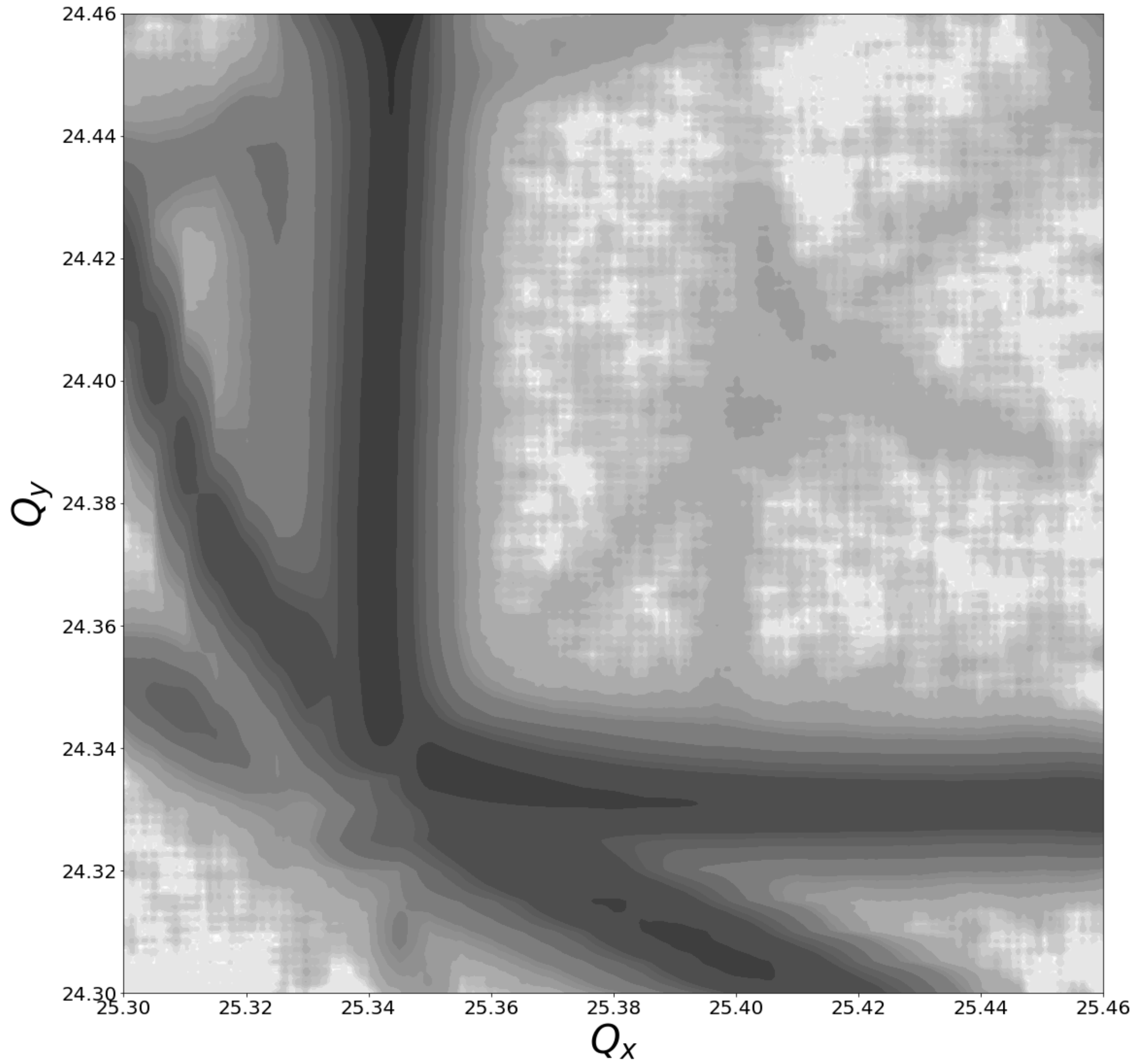
(New Energy) 10/08/2021

2D Tune Scans

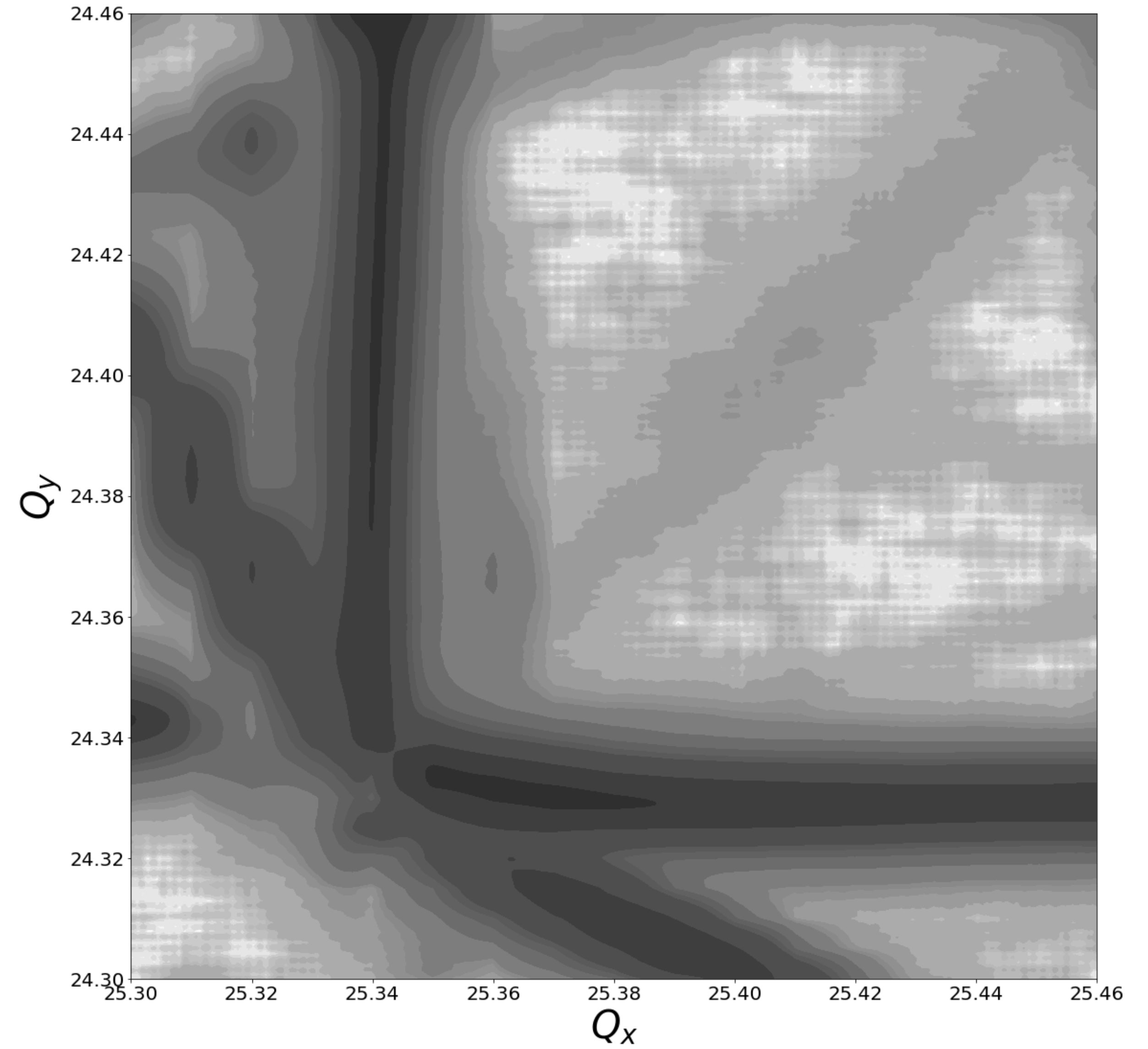


09/29/2021

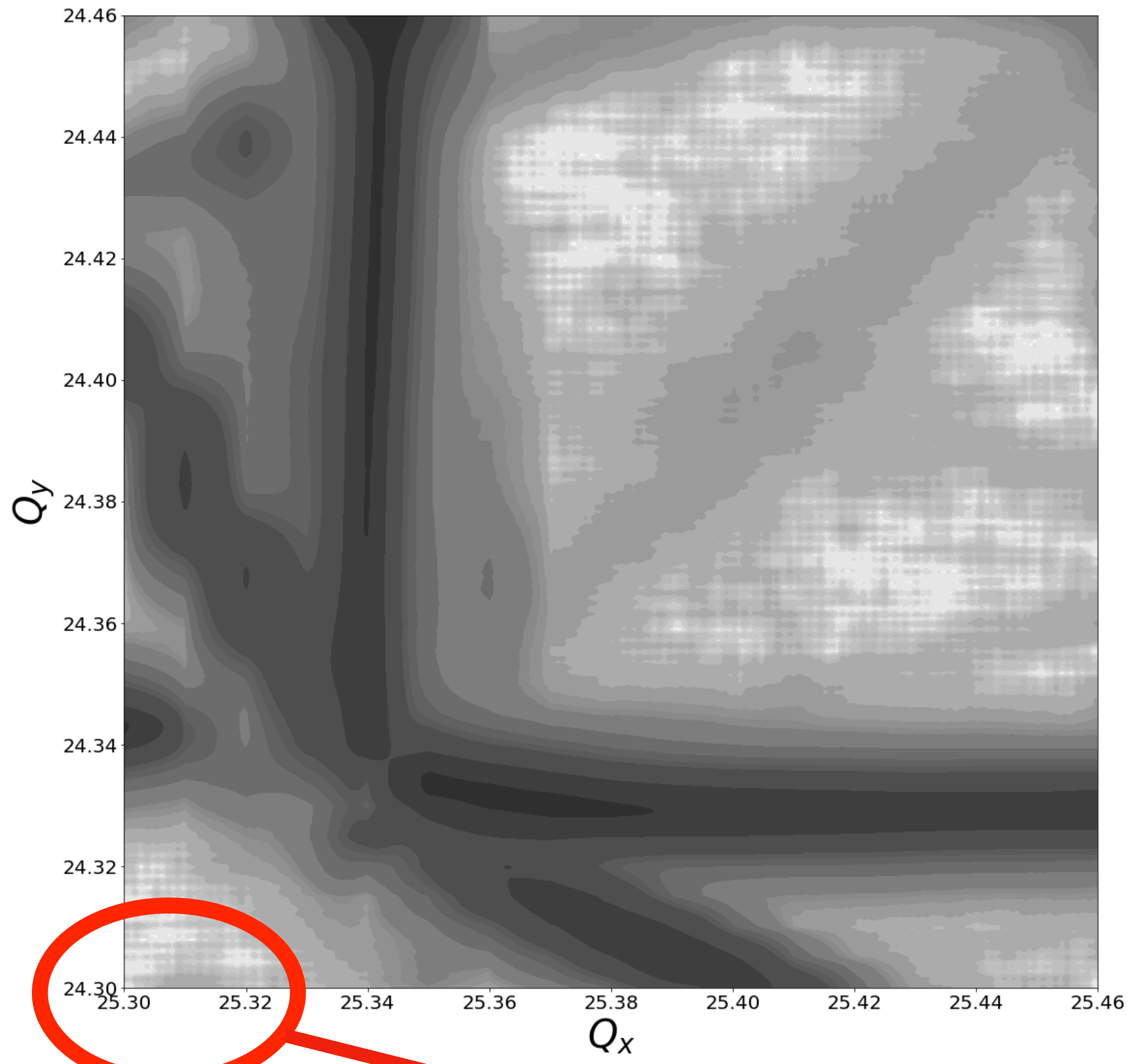
(ON-MOMENTUM) 09/29/2021



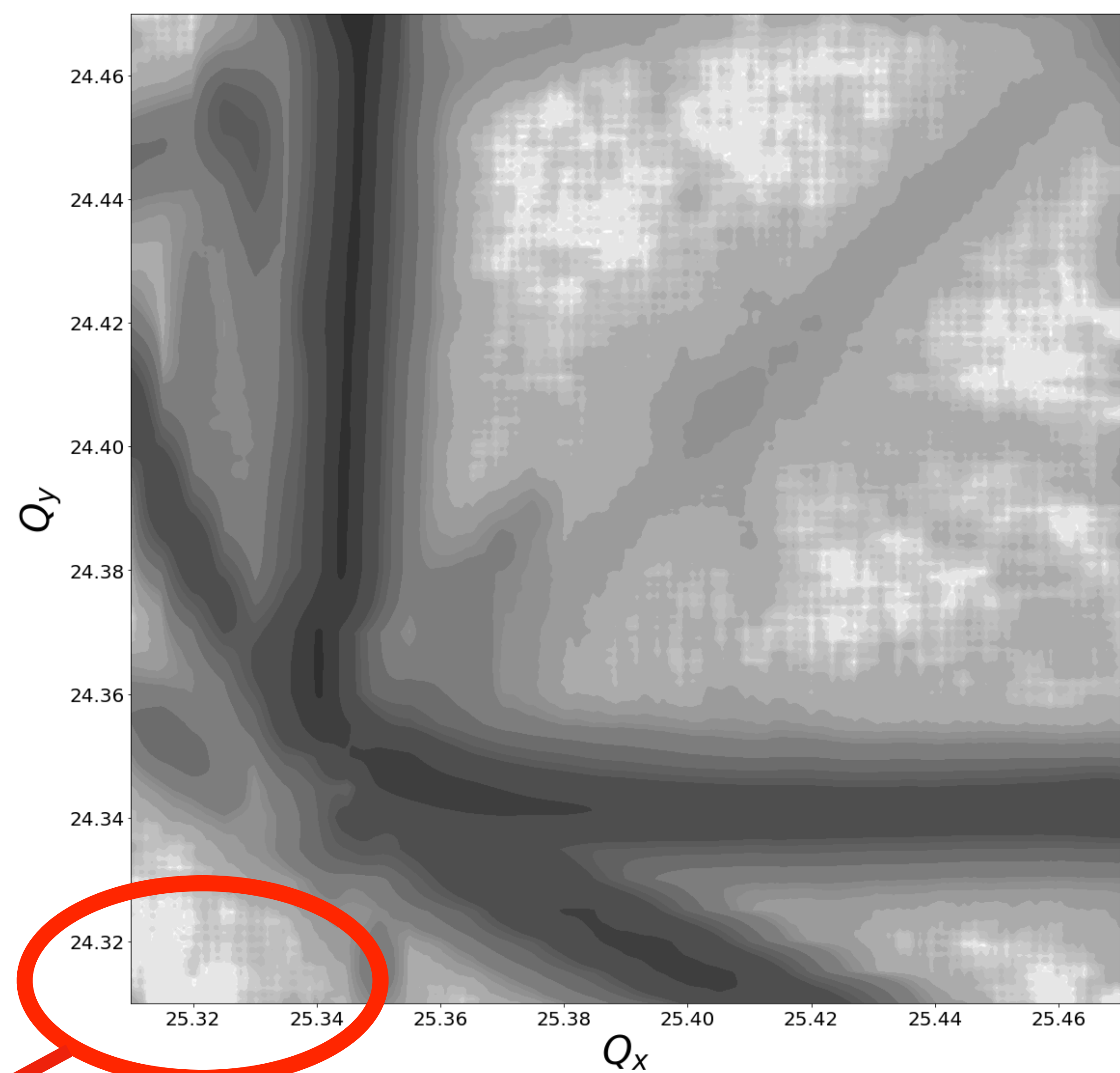
(ON-MOMENTUM) (New Orbit) 10/06/2021



(ON-MOMENTUM) (New Orbit) 10/06/2021



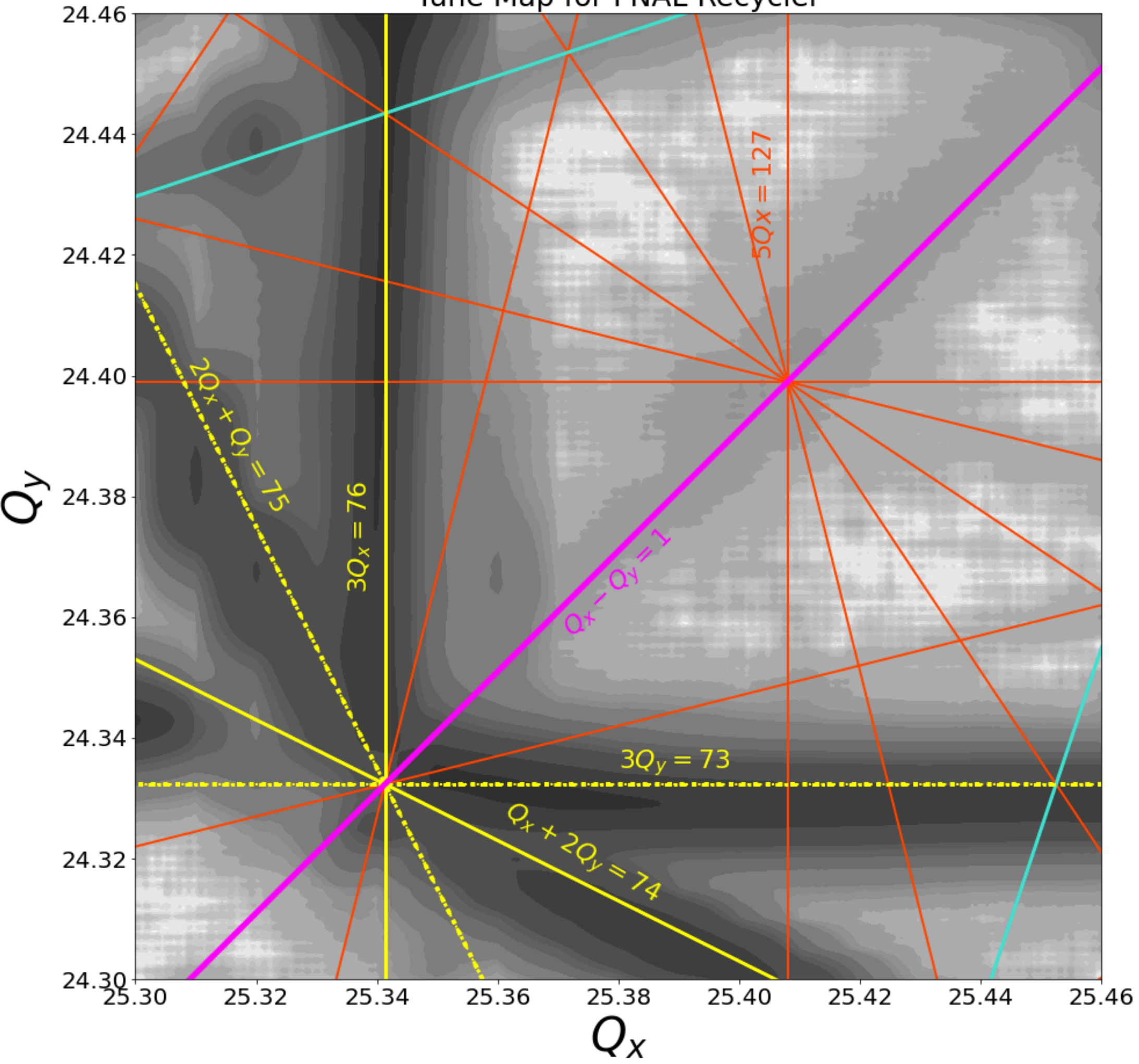
(OFF-MOMENTUM) 10/06/2021



TUNESHIFT DUE TO NEW ENERGY ~0.01

(ON-MOMENTUM) (New Orbit) 10/06/2021

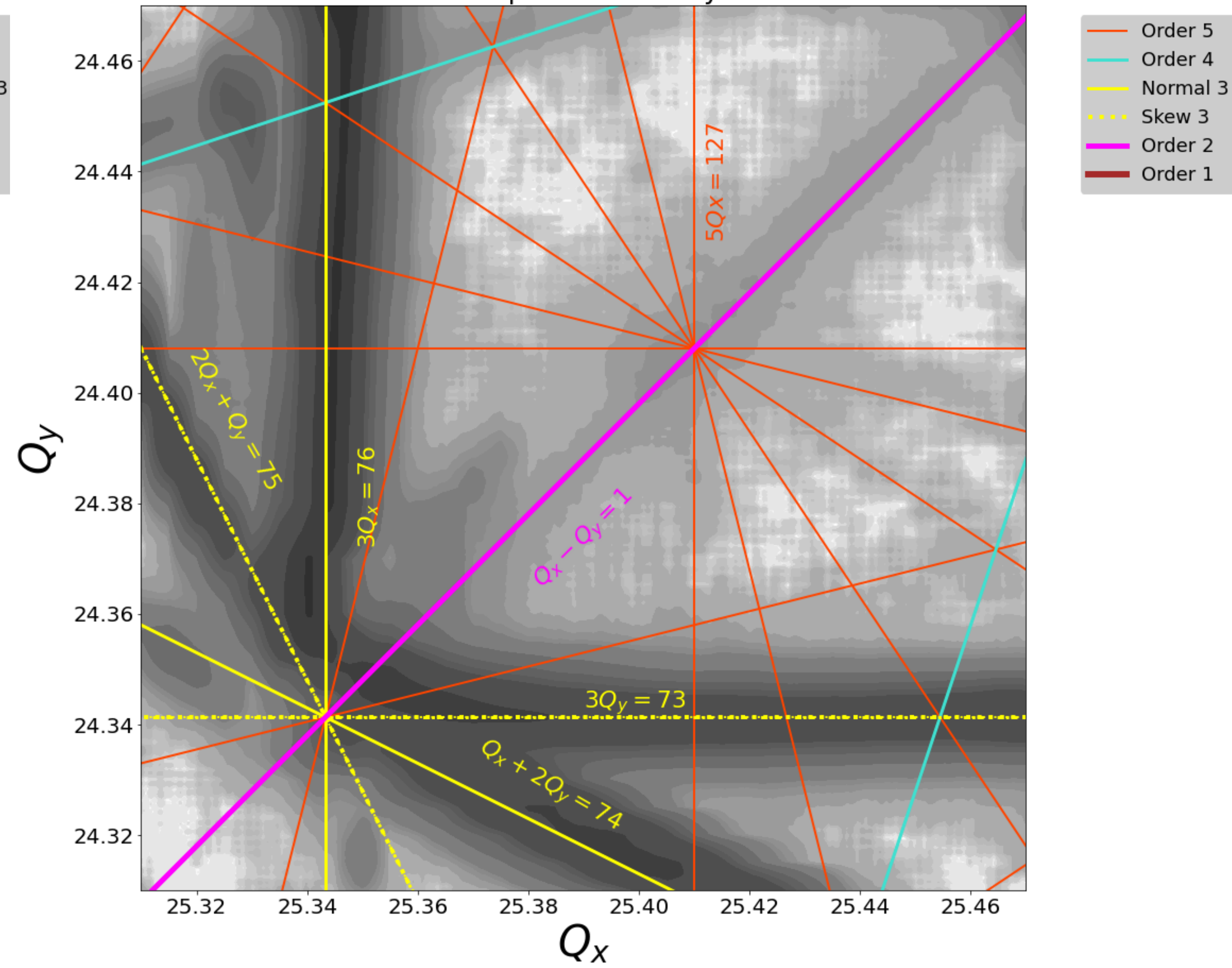
Tune Map for FNAL Recycler



- Order 5
- Order 4
- Normal 3
- Skew 3
- Order 2
- Order 1

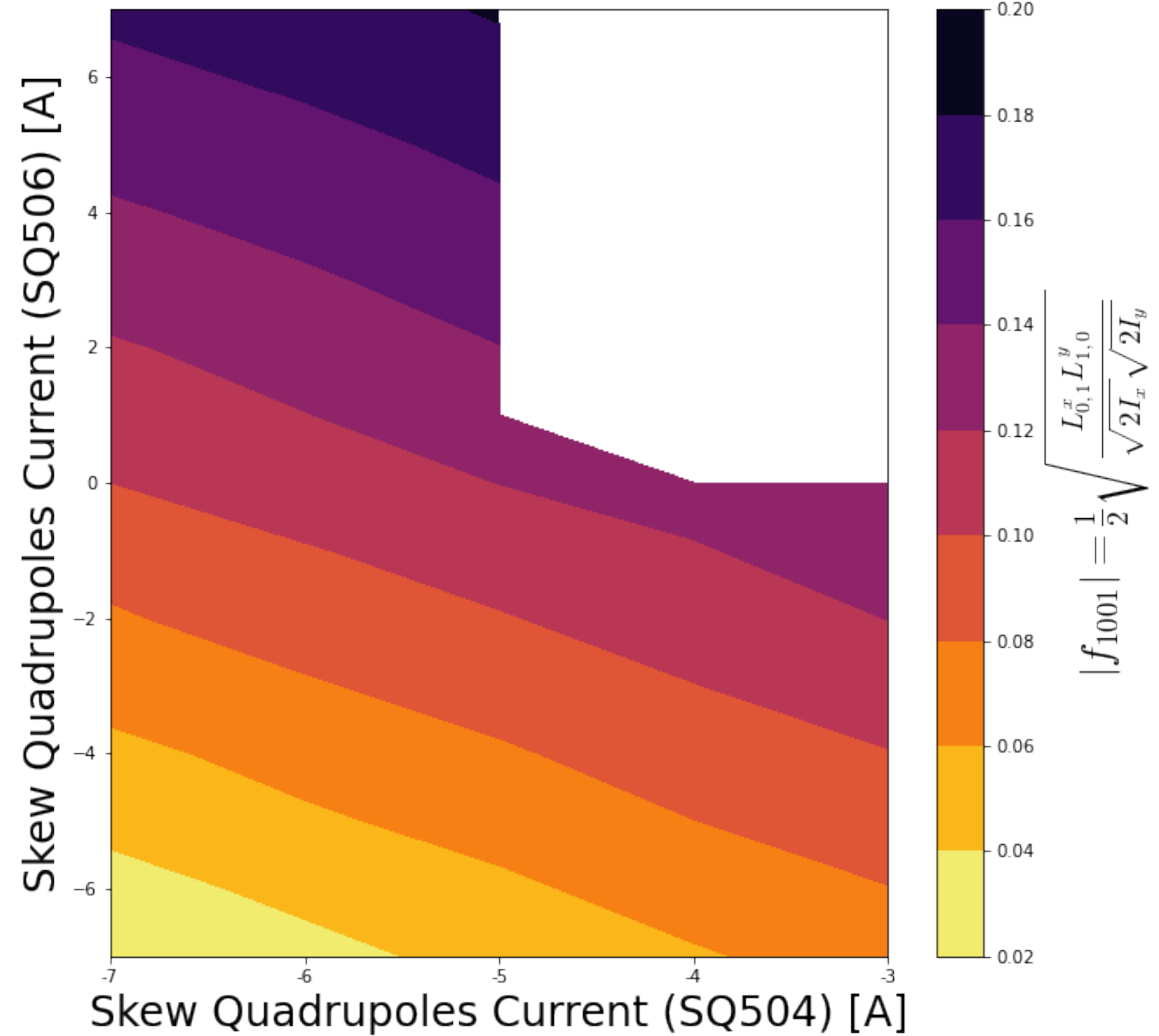
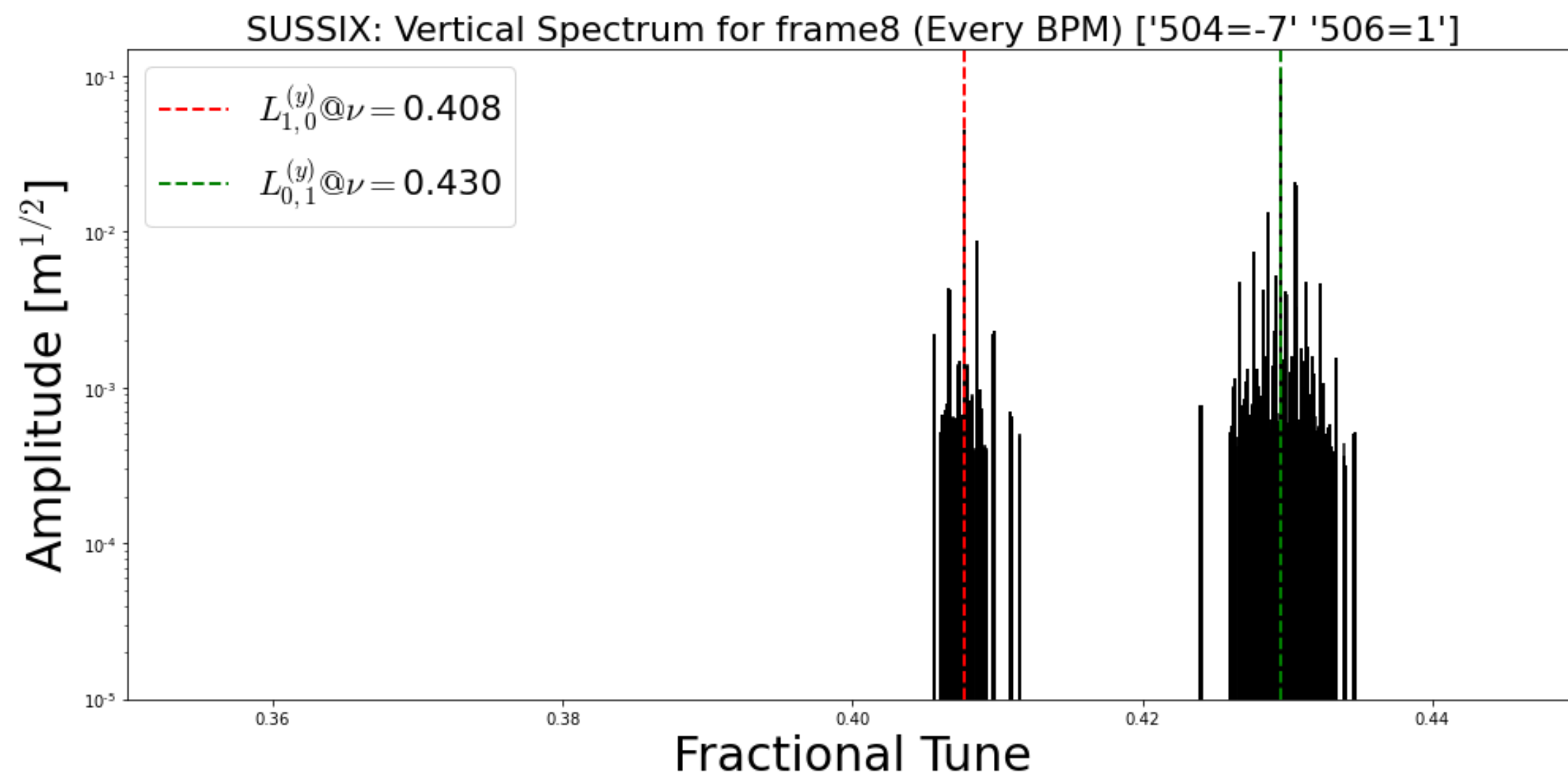
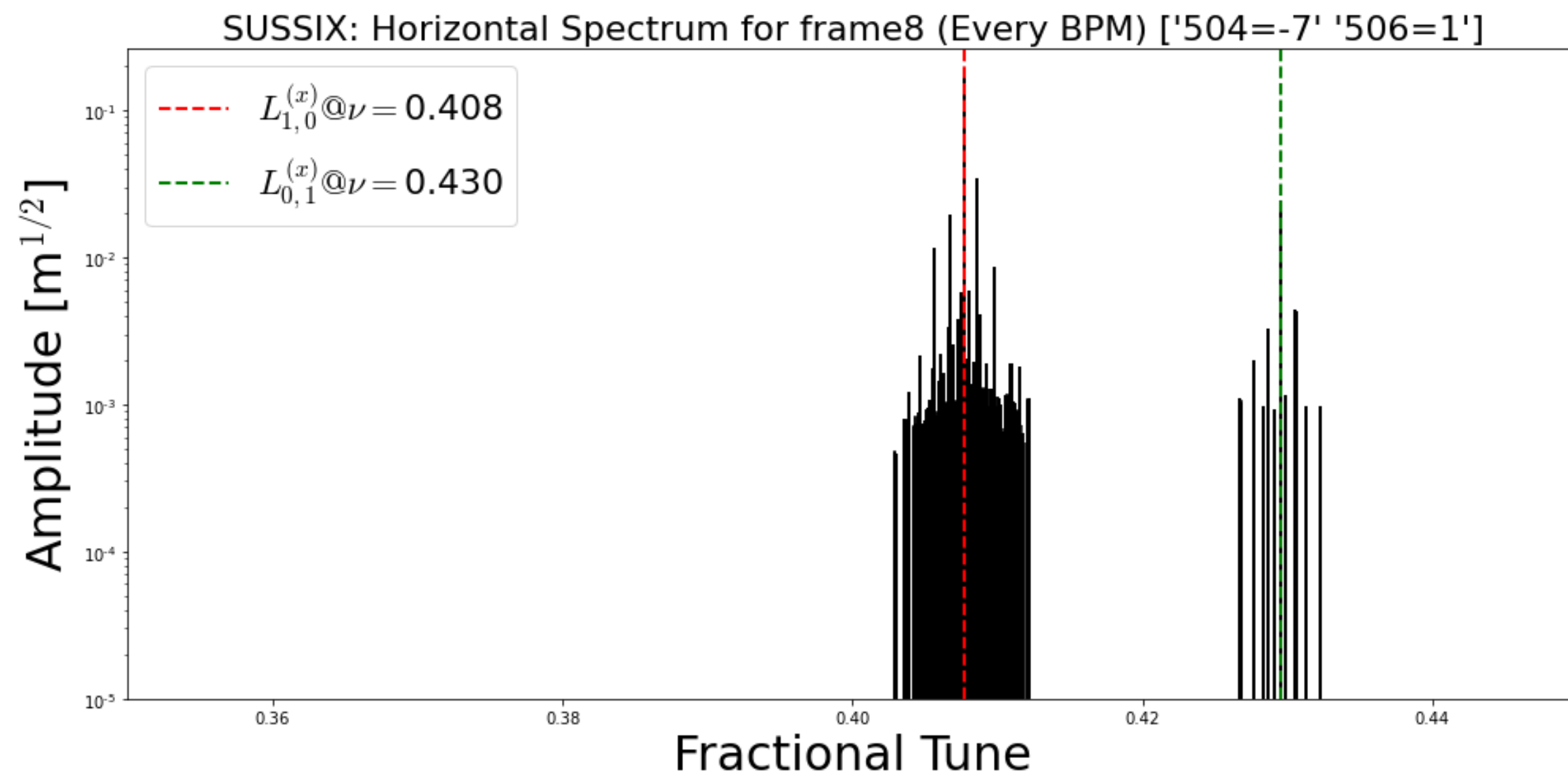
(OFF-MOMENTUM) 10/06/2021

Tune Map for FNAL Recycler



- Order 5
- Order 4
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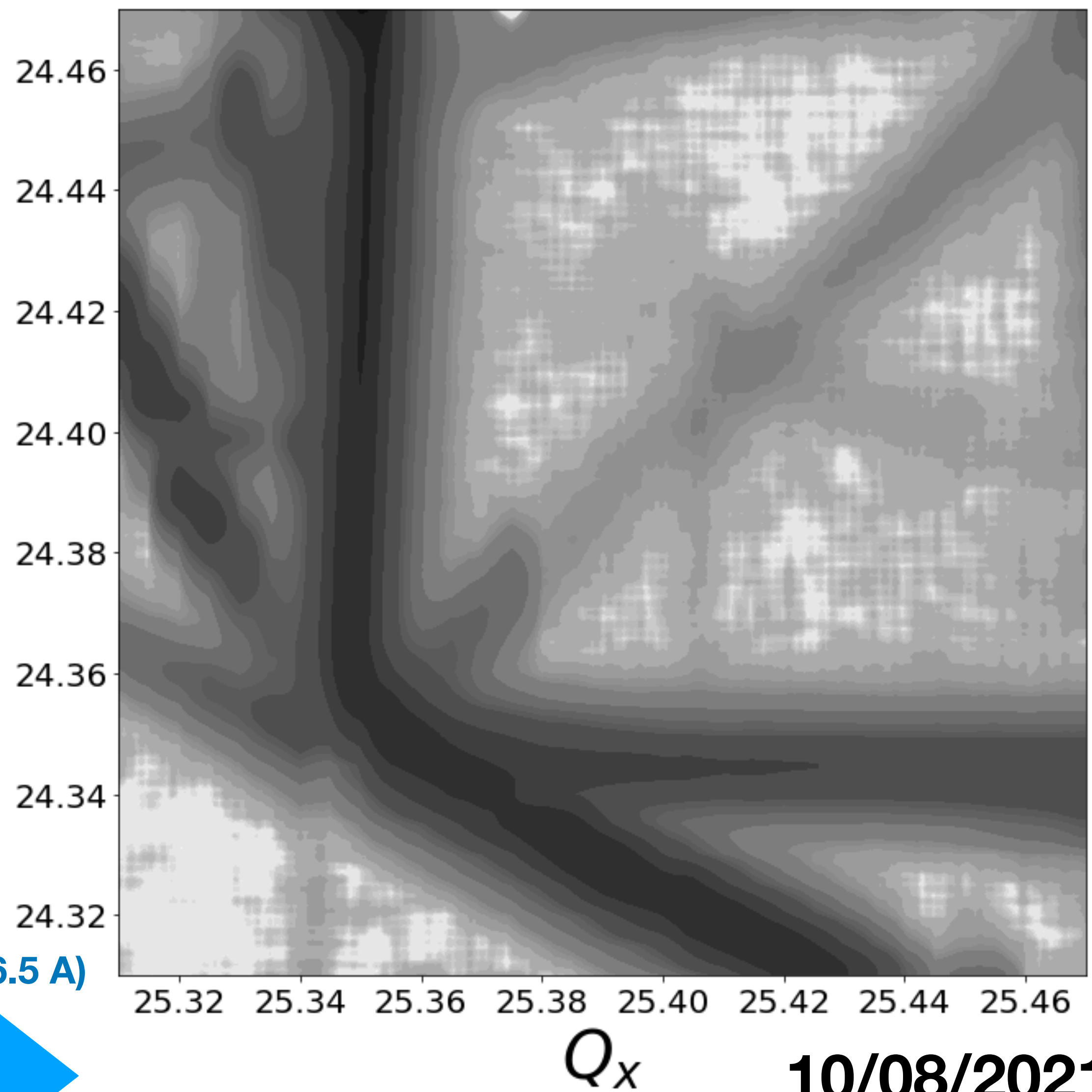
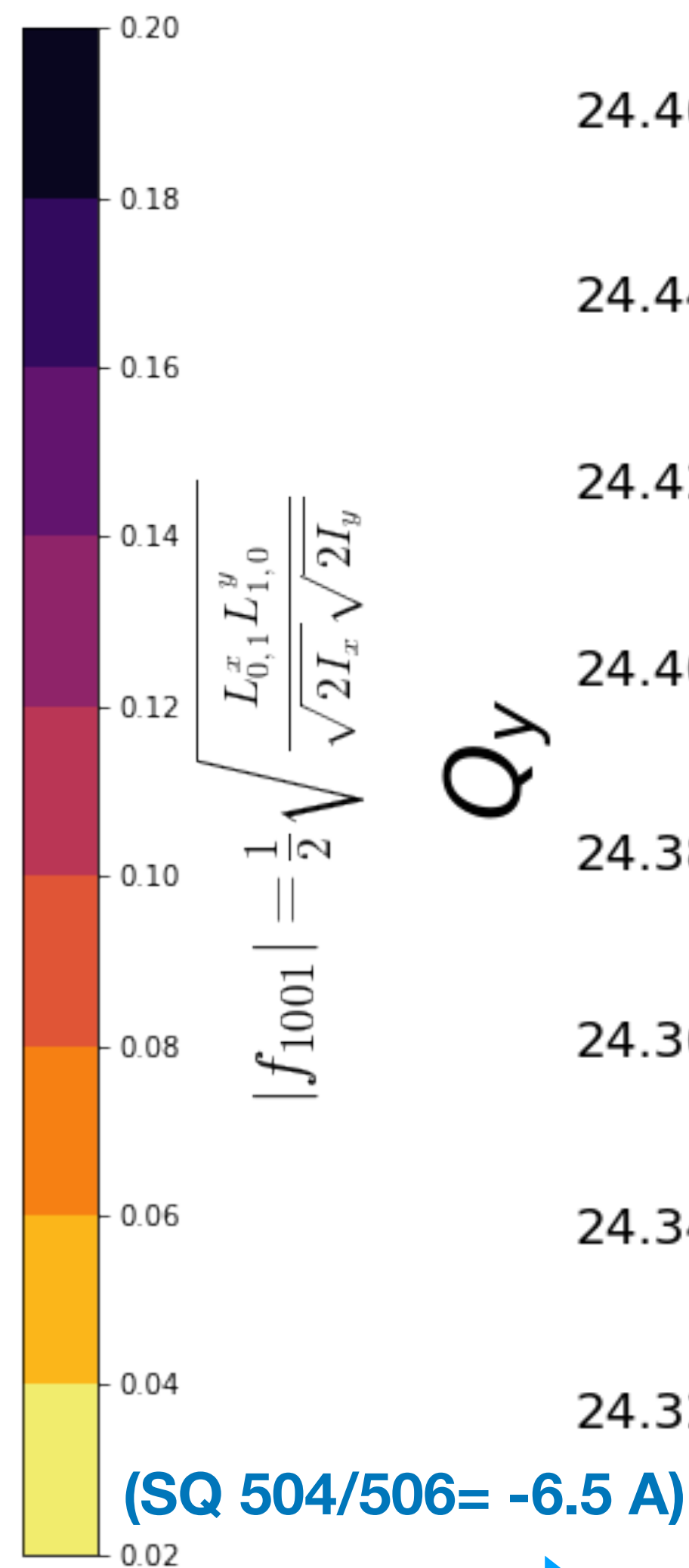
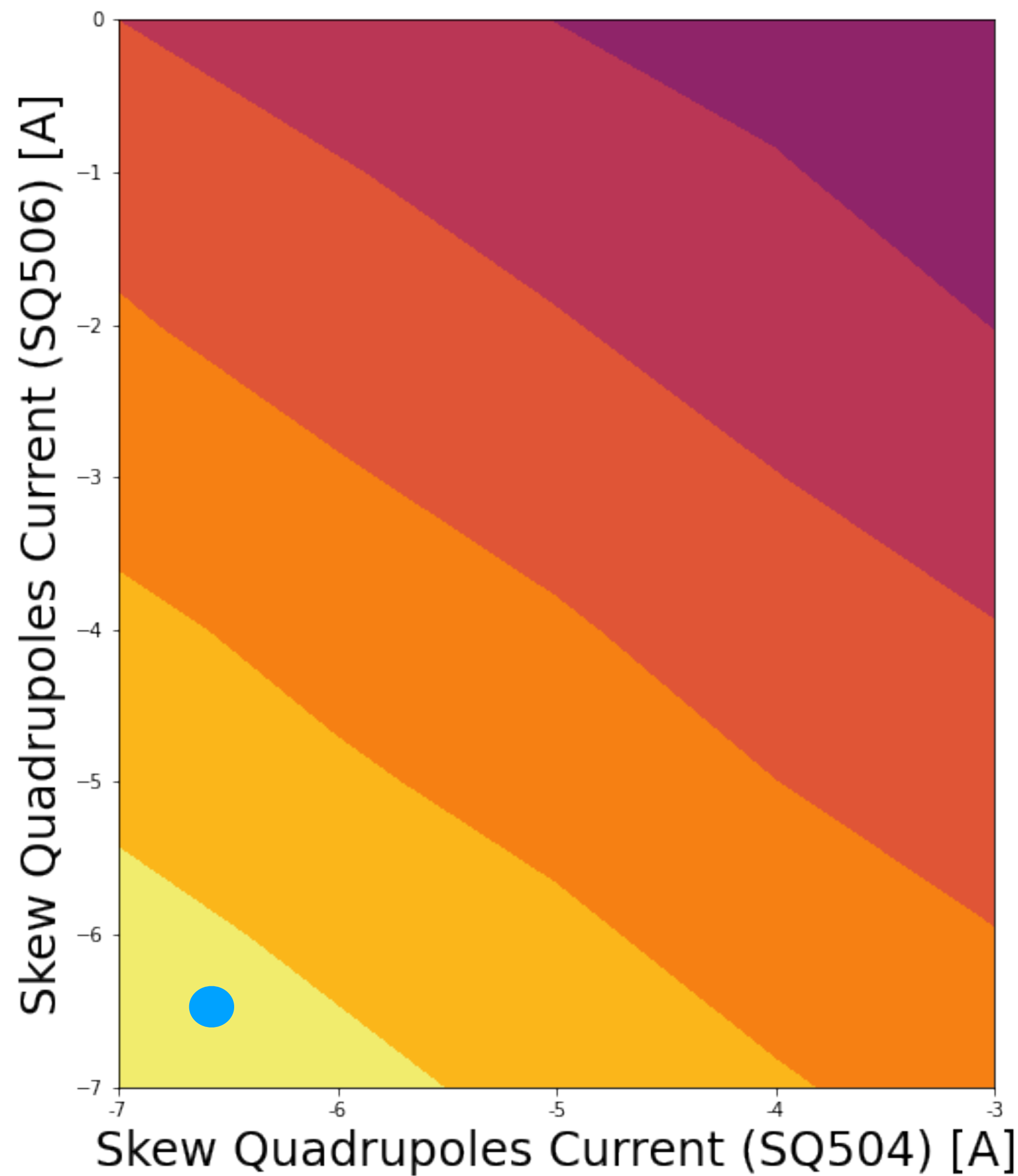
Linear Coupling Resonance (OFF-MOMENTUM)



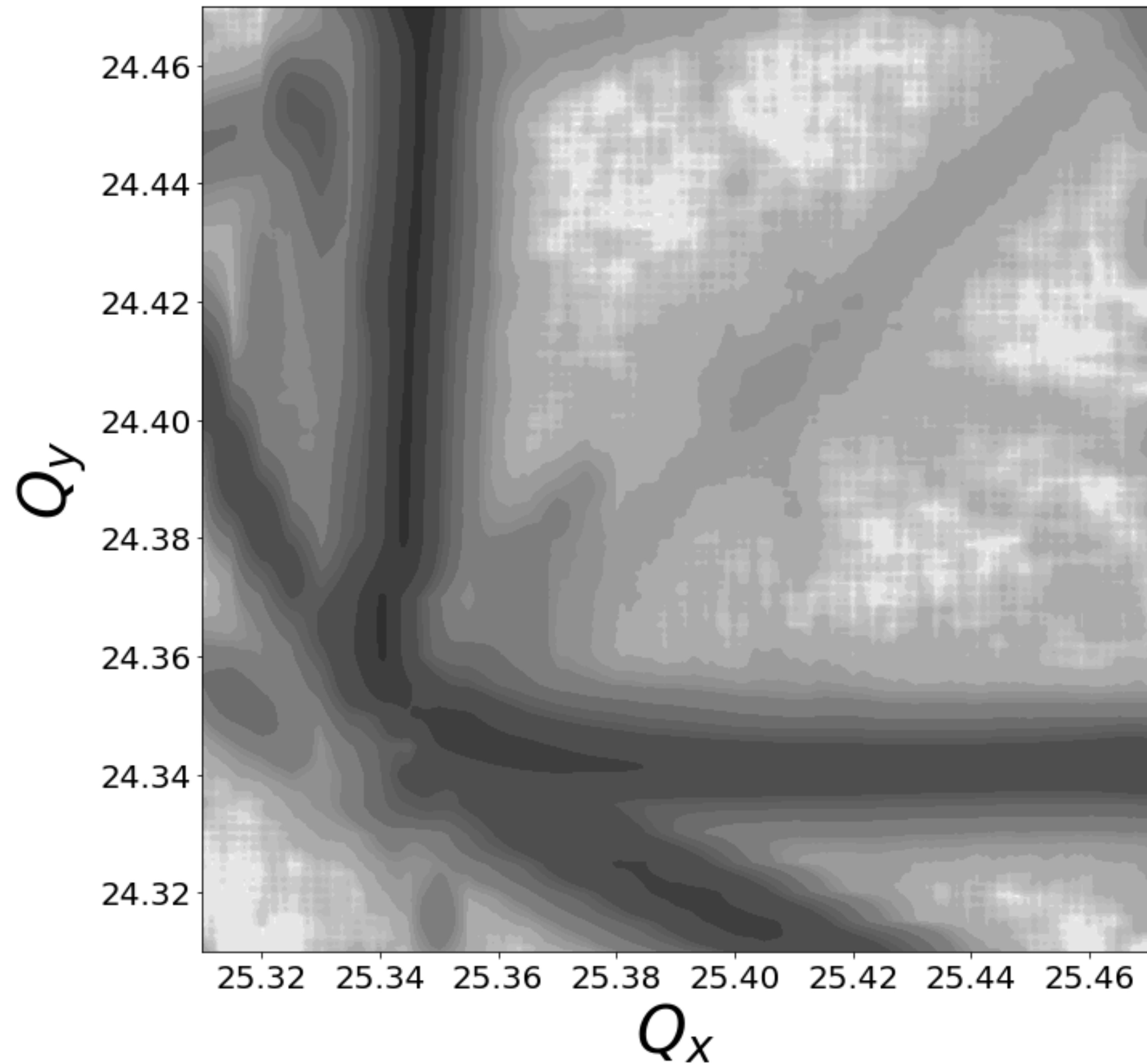
10/08/2021

Linear Coupling Resonance (OFF-MOMENTUM)

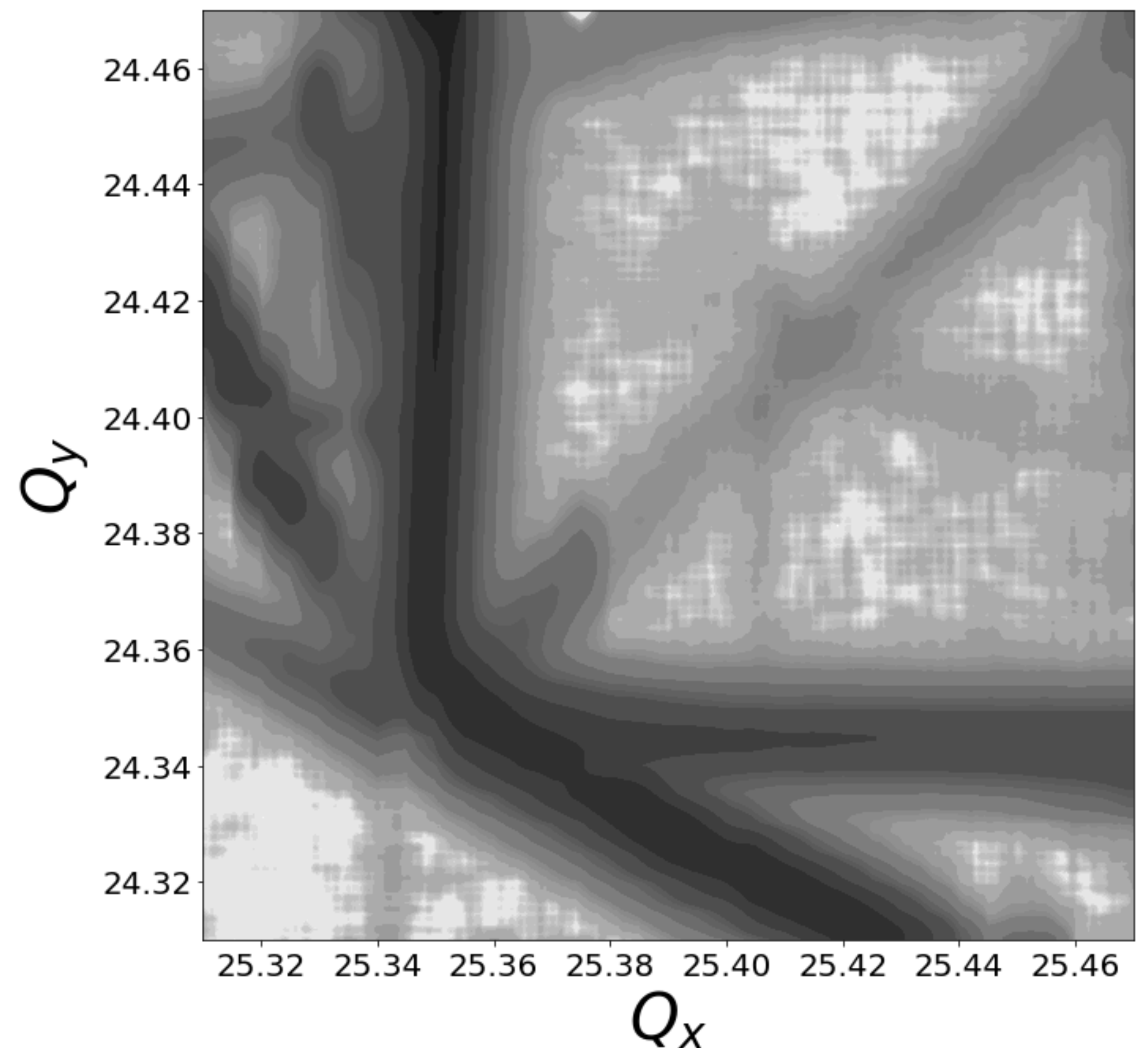
New Energy (SQ 504/506= -6.5 A)
10/08/2021



Linear Coupling Resonance (OFF-MOMENTUM)



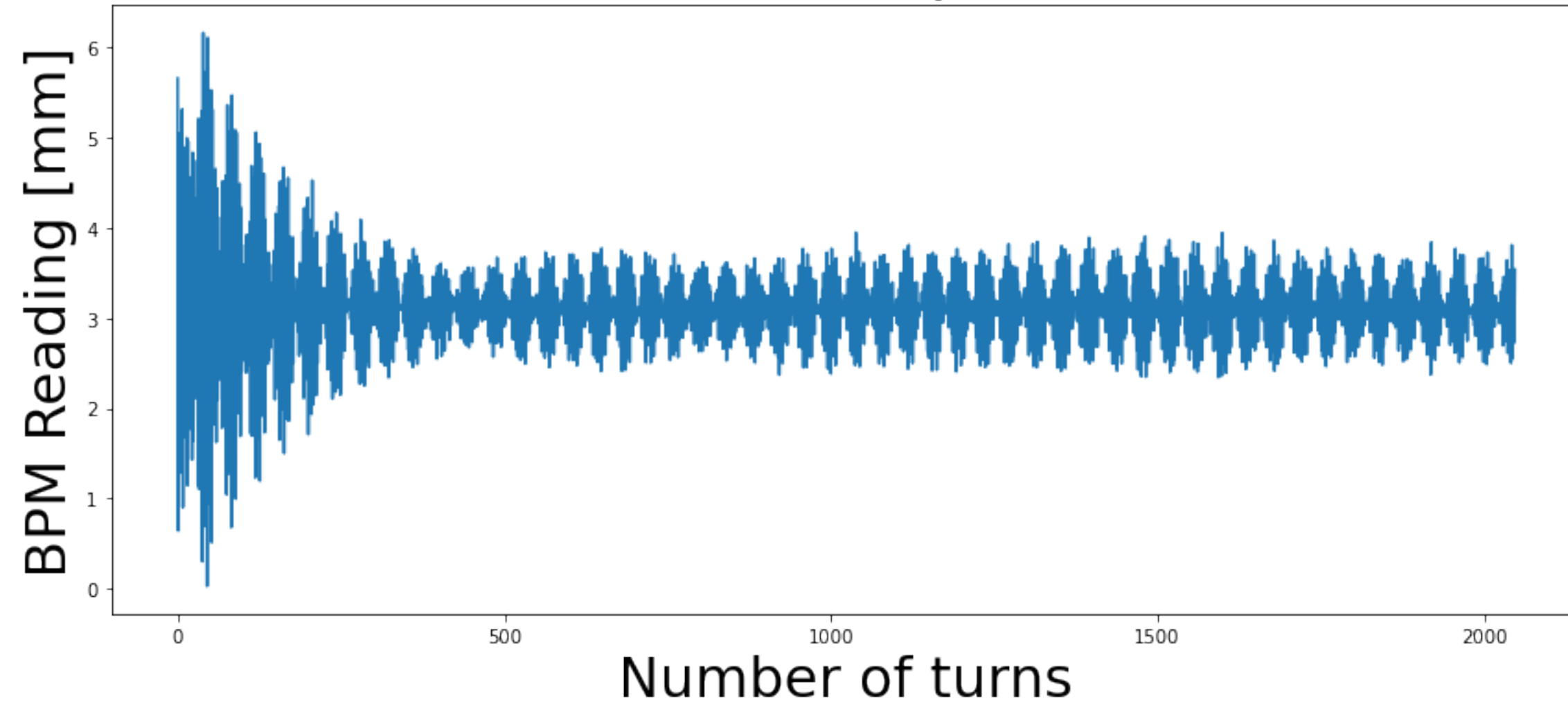
New Energy (SQ 504/506= 0 A) 10/08/2021



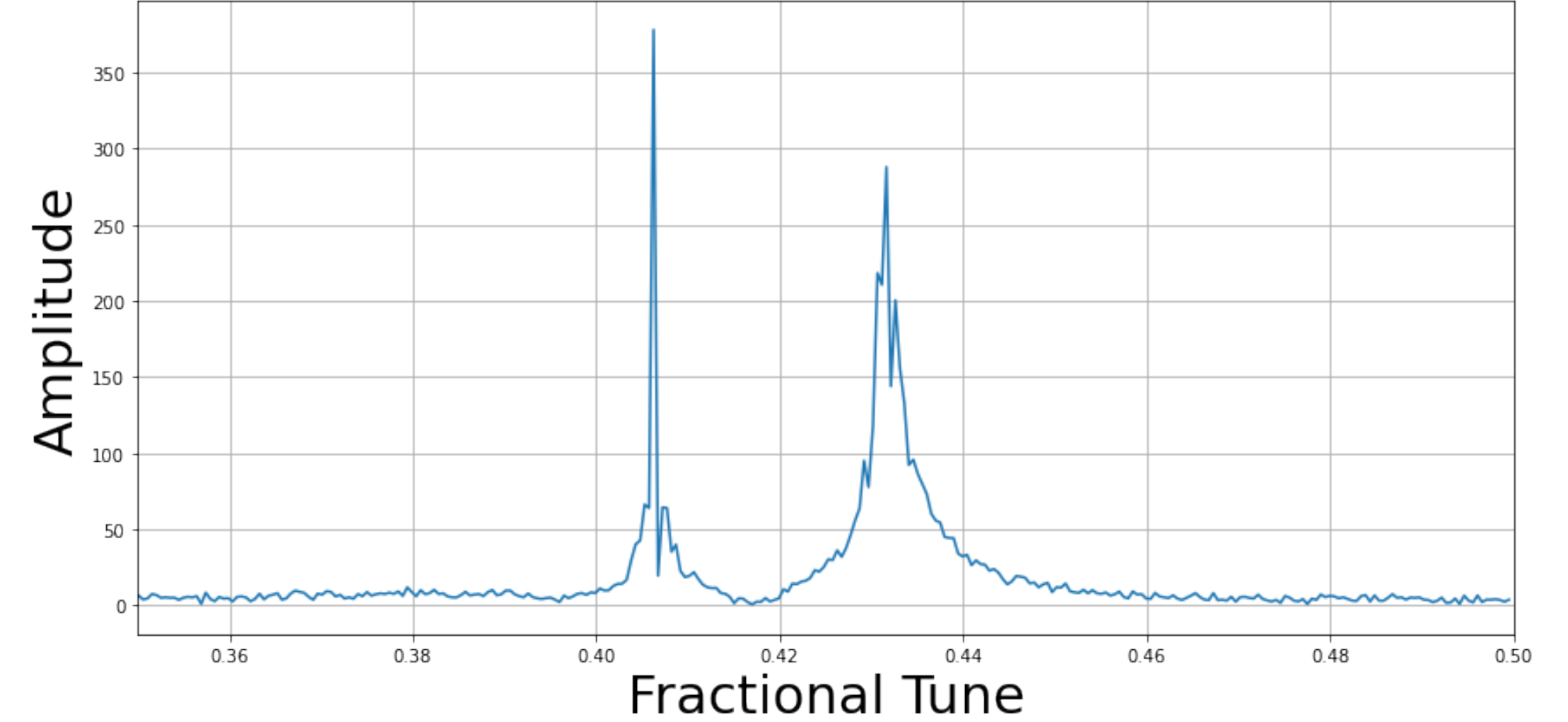
New Energy (SQ 504/506= -6.5 A) 10/08/2021

Linear Coupling Resonance (OFF-MOMENTUM)

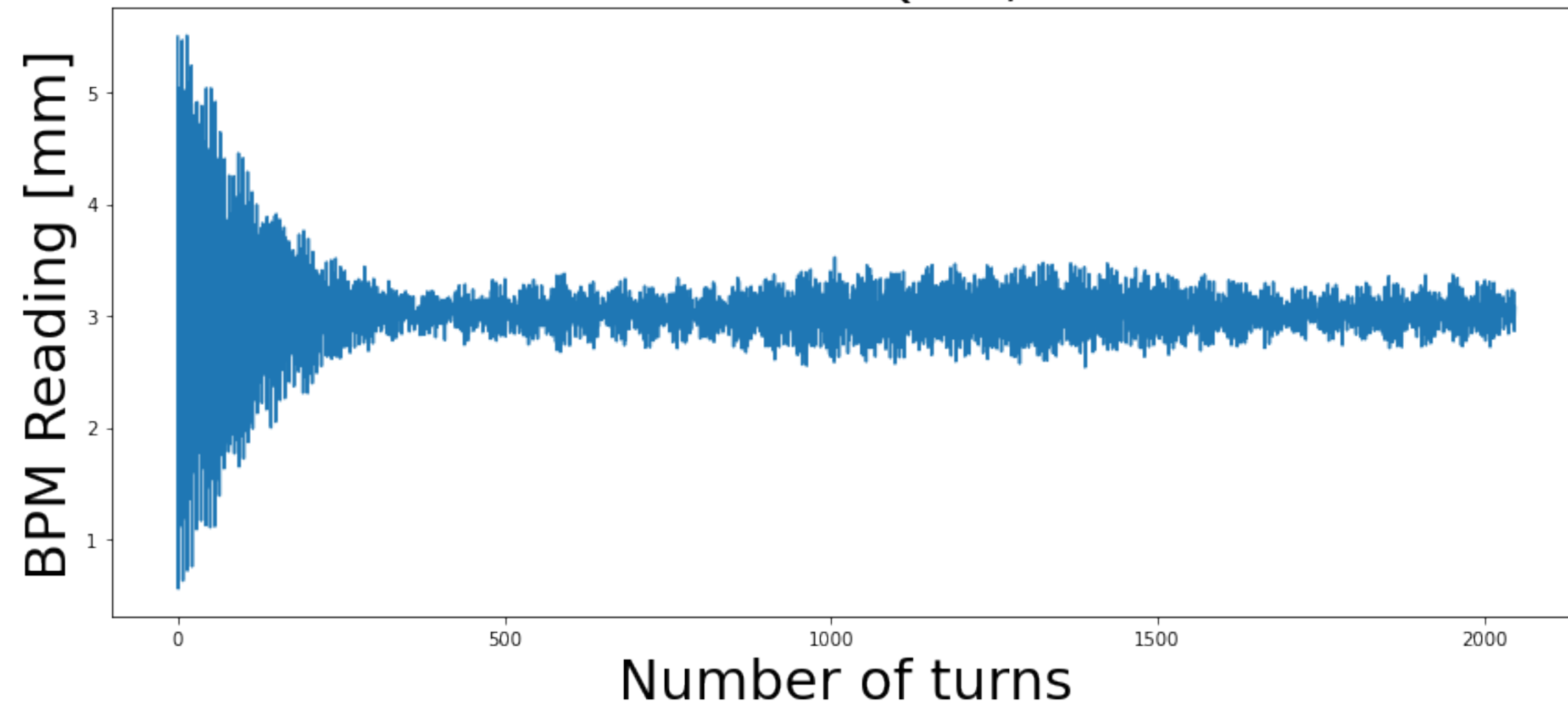
R:VP221 READING SQ504/506=0 A



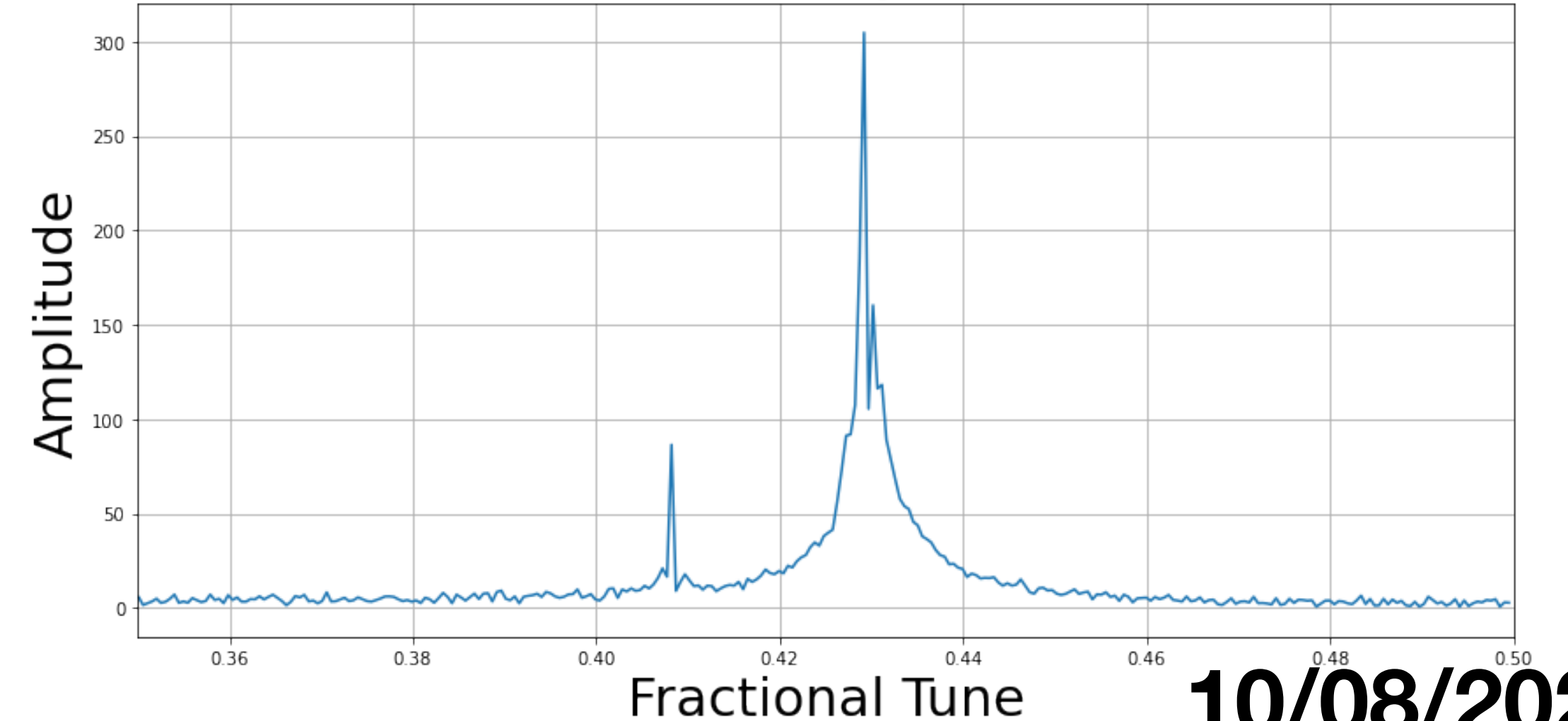
R:VP221 READING SQ504/506=0 A



R:VP221 READING SQ504/506=-6.5 A



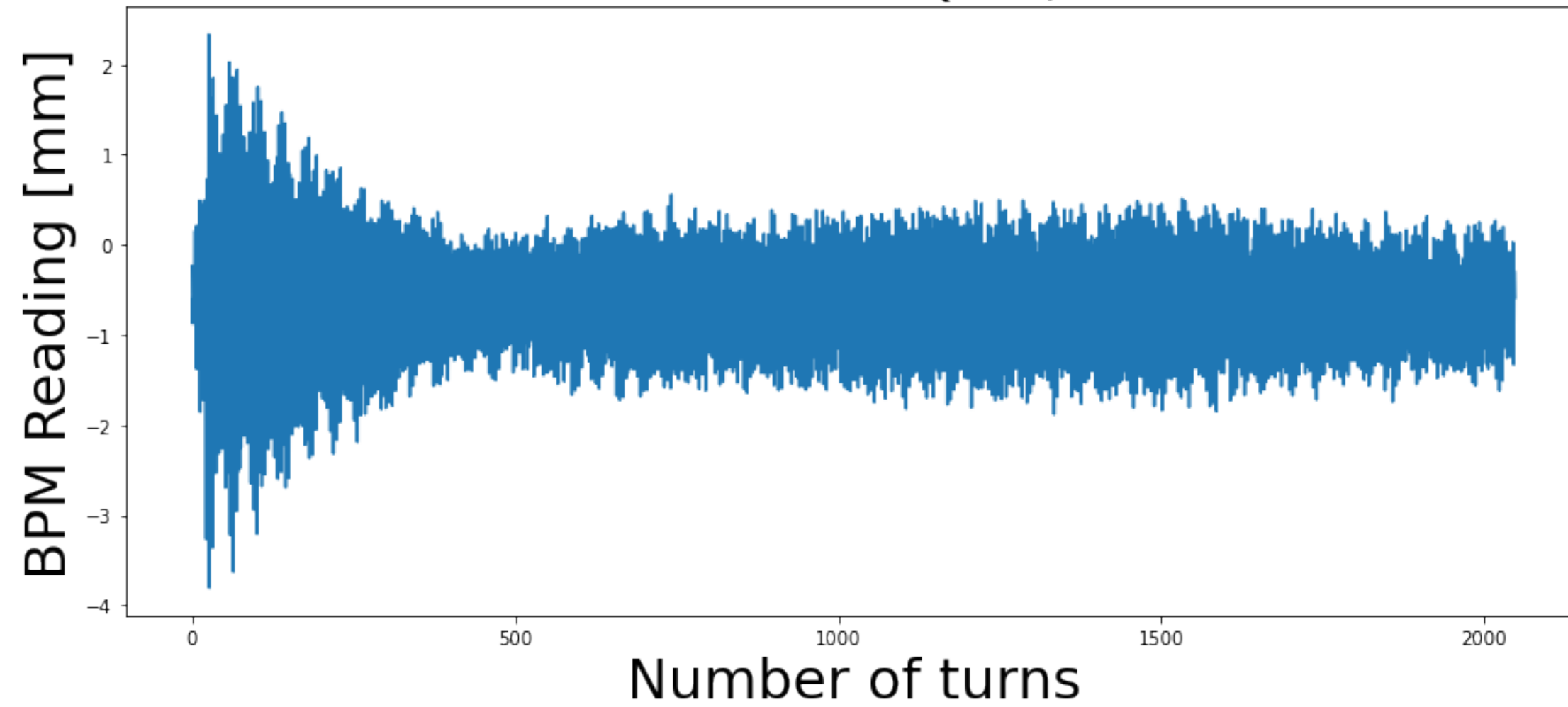
R:VP221 READING SQ504/506=-6.5 A



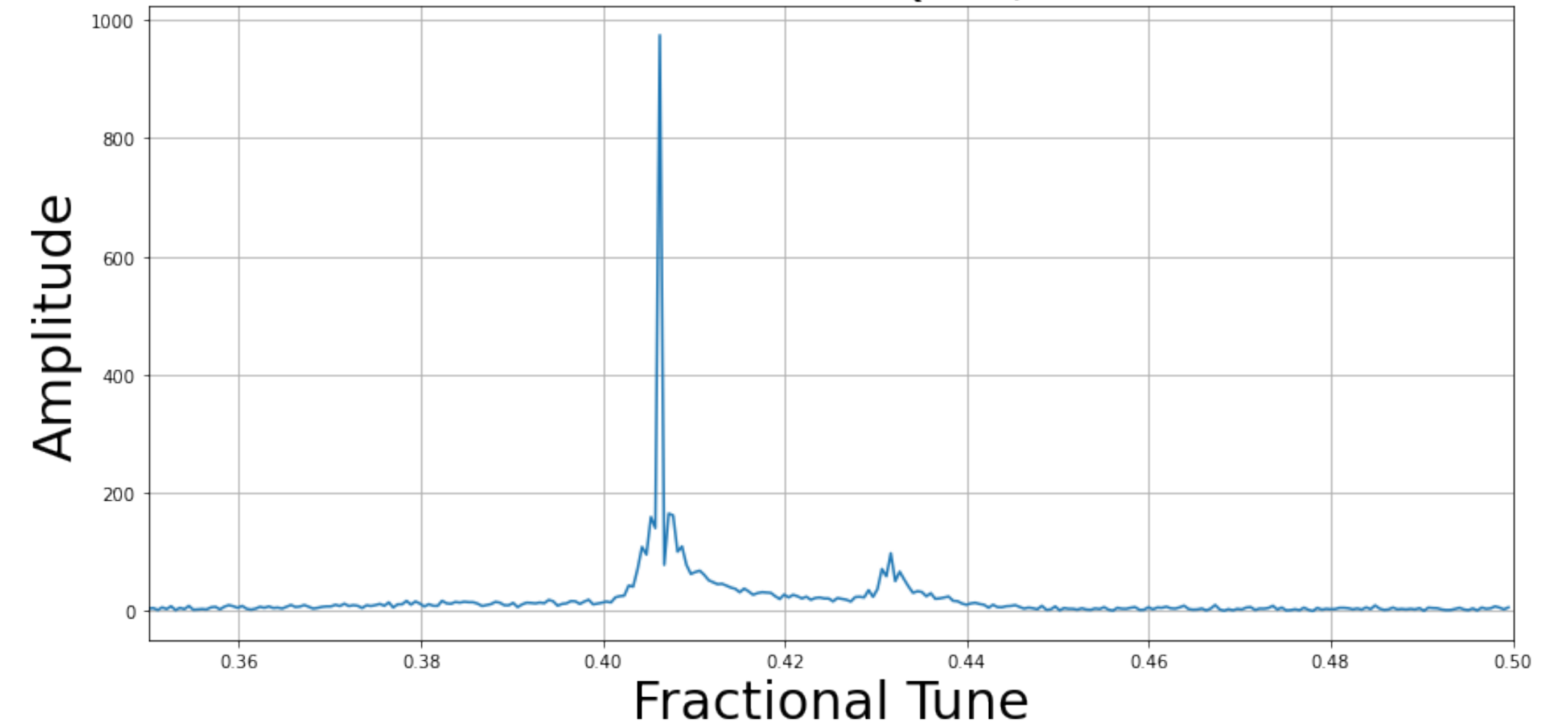
10/08/2021

Linear Coupling Resonance (OFF-MOMENTUM)

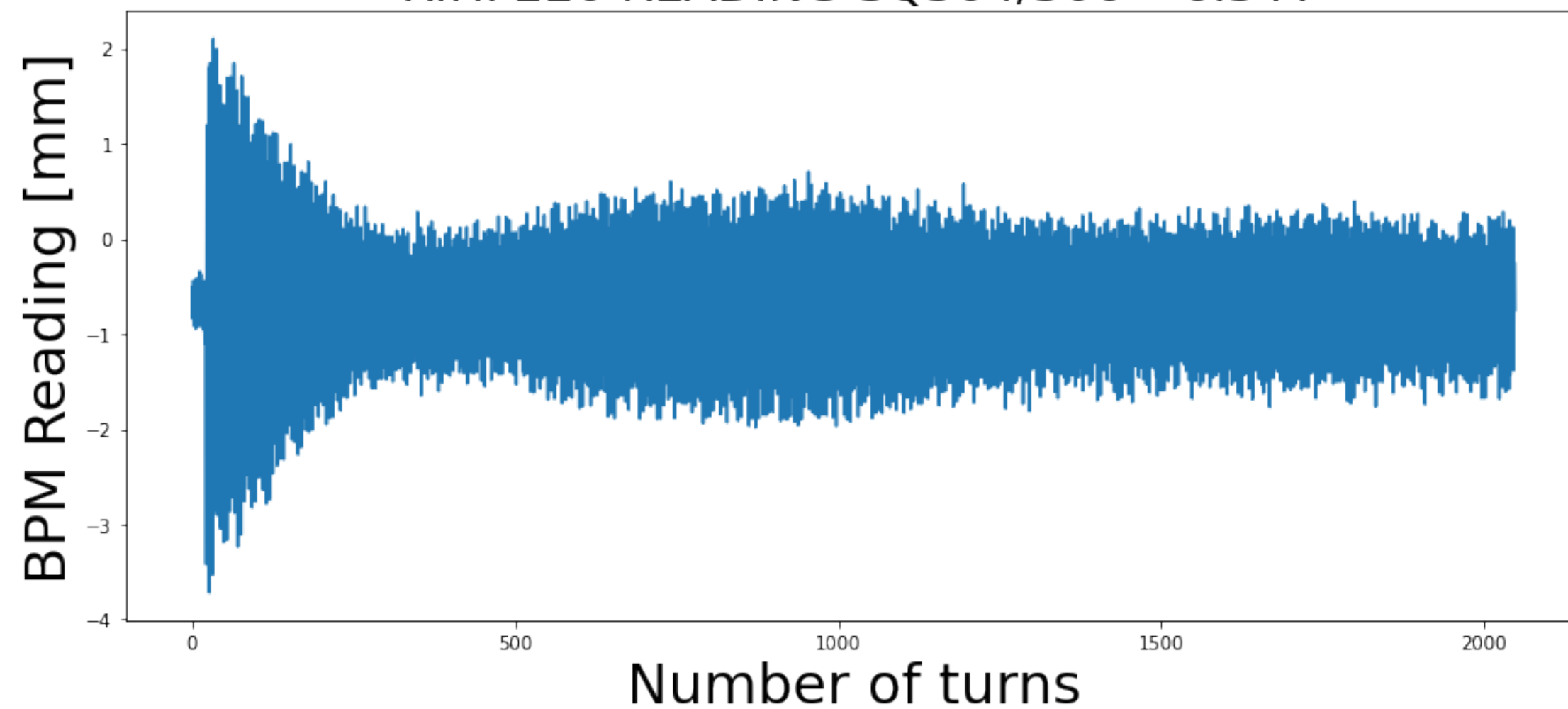
R:HP220 READING SQ504/506=0 A



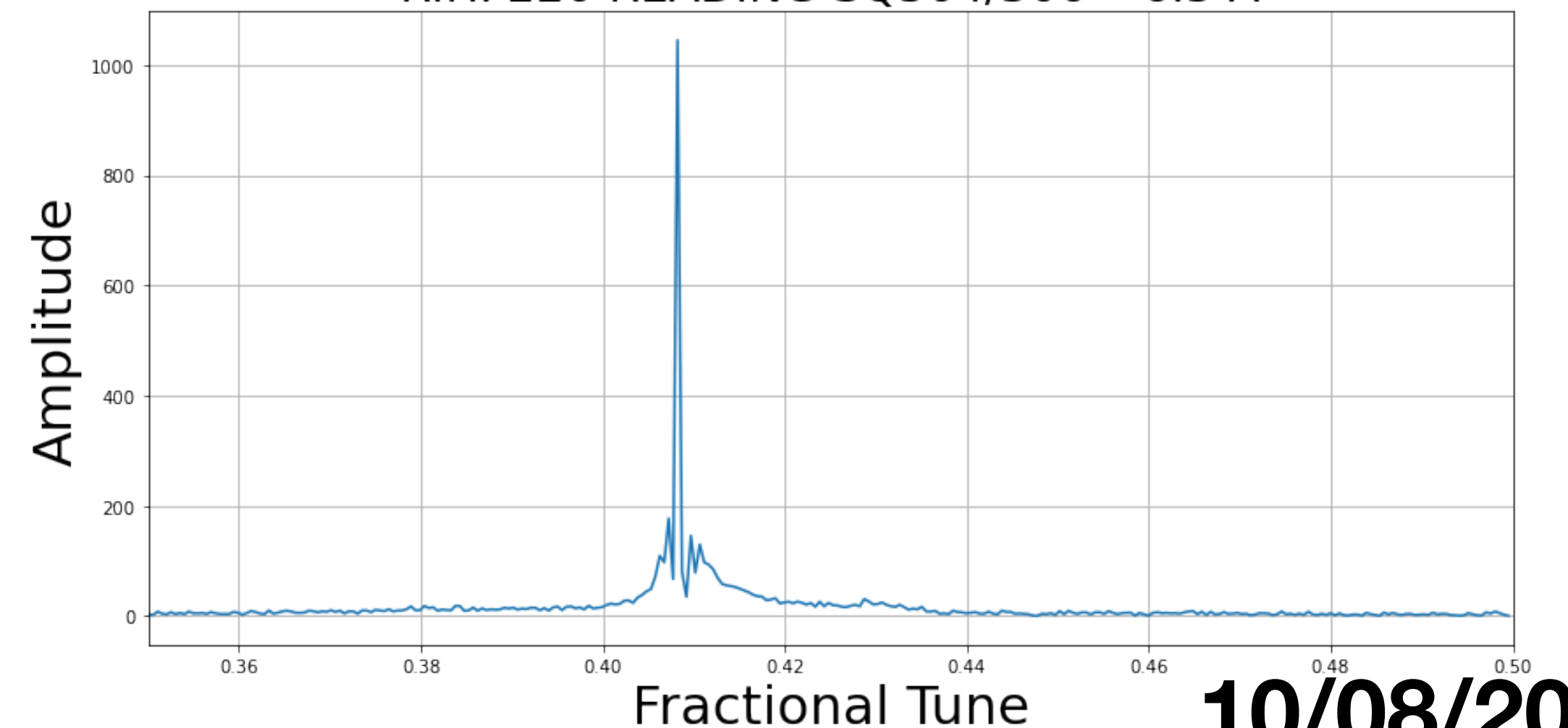
R:HP220 READING SQ504/506=0 A



R:HP220 READING SQ504/506=-6.5 A



R:HP220 READING SQ504/506=-6.5 A



10/08/2021

Linear Coupling Resonance (OFF-MOMENTUM)

PB R2 RR Tune & Chromati

R2 Tune Control ->Op-Tune Shares: 1.00(QT-60X) + 0.00(QT-30X) ◆Pgm_Tools◆

CYCLE-E0 | p-Comp | pdot-Comp | beam-Comp | Tromb | Parameters | C453 Config | MAIN MENU

Save Before Shutdown 2019

| # | T-Sec | dT-Sec | Q.h | dQ.h | Q.v | dQ.v |
|---|-------|--------|-------|--------|-------|---------|
| 0 | .035 | .035 | 25.42 | -.0361 | 24.44 | .047401 |
| 1 | .8 | .765 | 25.42 | -.0361 | 24.44 | .047401 |

◆Insert◆Delete

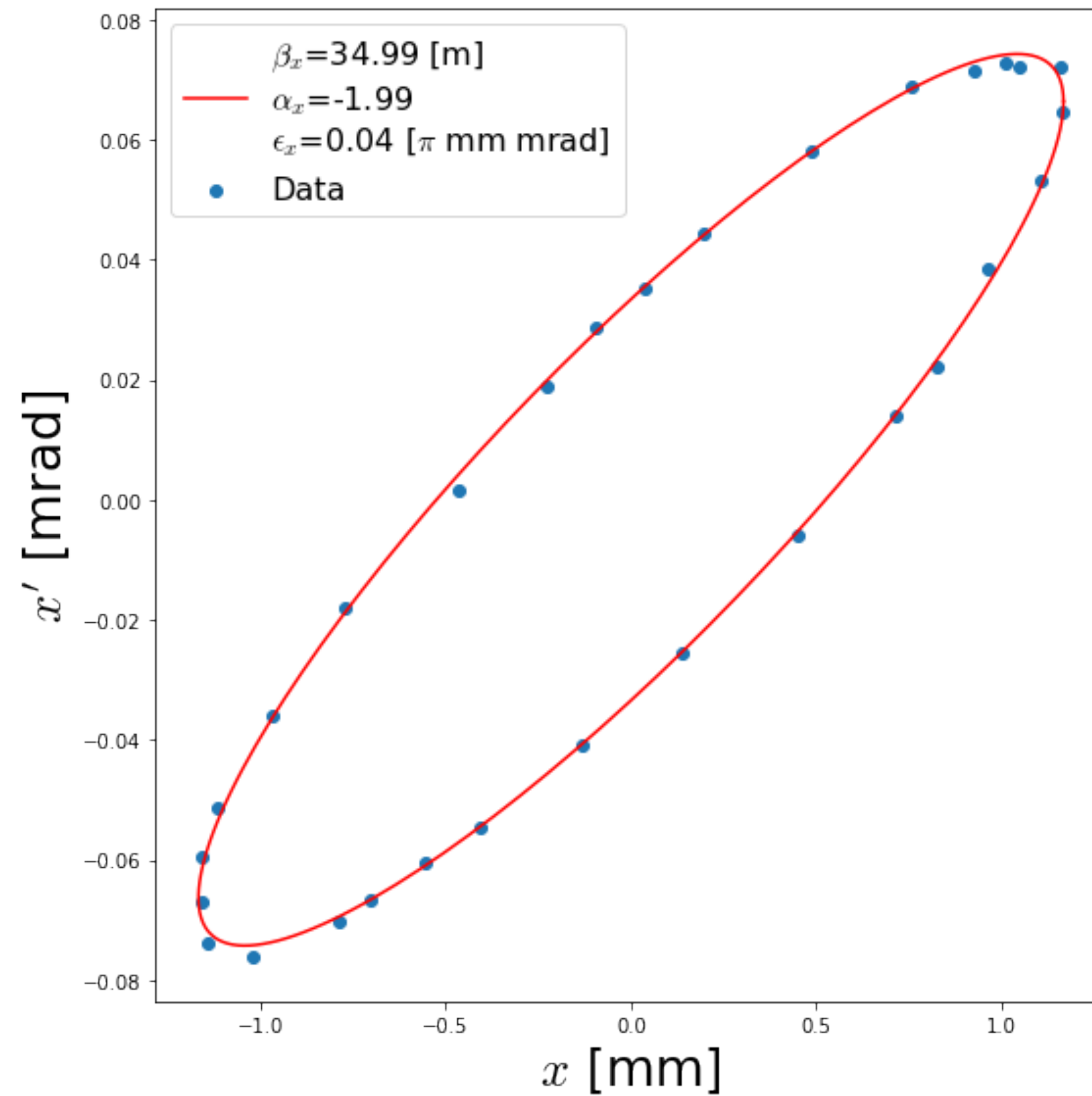
Messages

Sent op-tune to QT-30X(0.00 share) time tables OK.
Both dQH and dQV are zero, ingoring trombone and setting quad trim f(t) curr
Both dQH and dQV are zero, ingoring trombone and setting quad trim f(t) curr
Sent op-tune to QT-60X(1.00 share) time tables OK.

1:4 of 5

BACK-UP

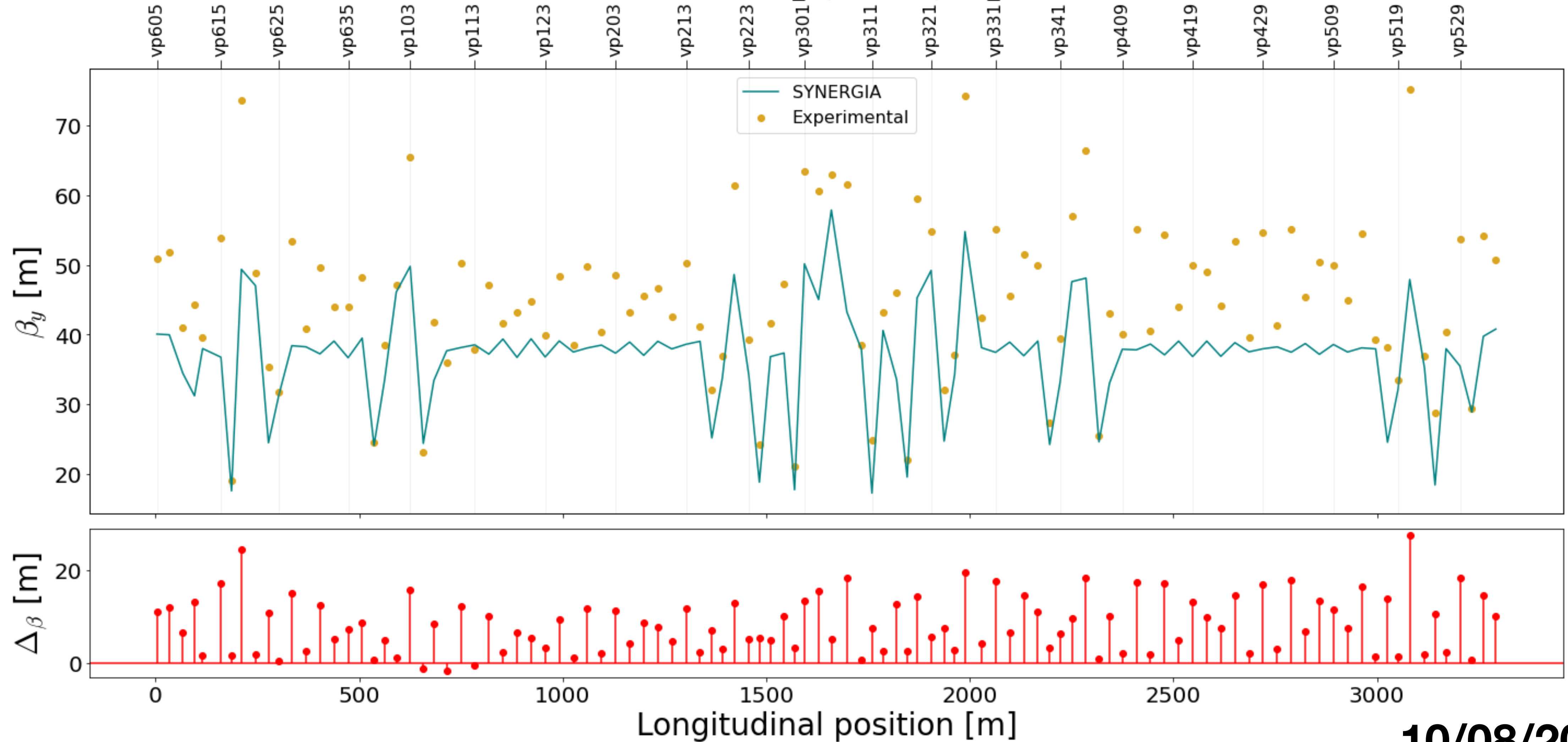
Beta functions (ON-MOMENTUM)



10/04/2021

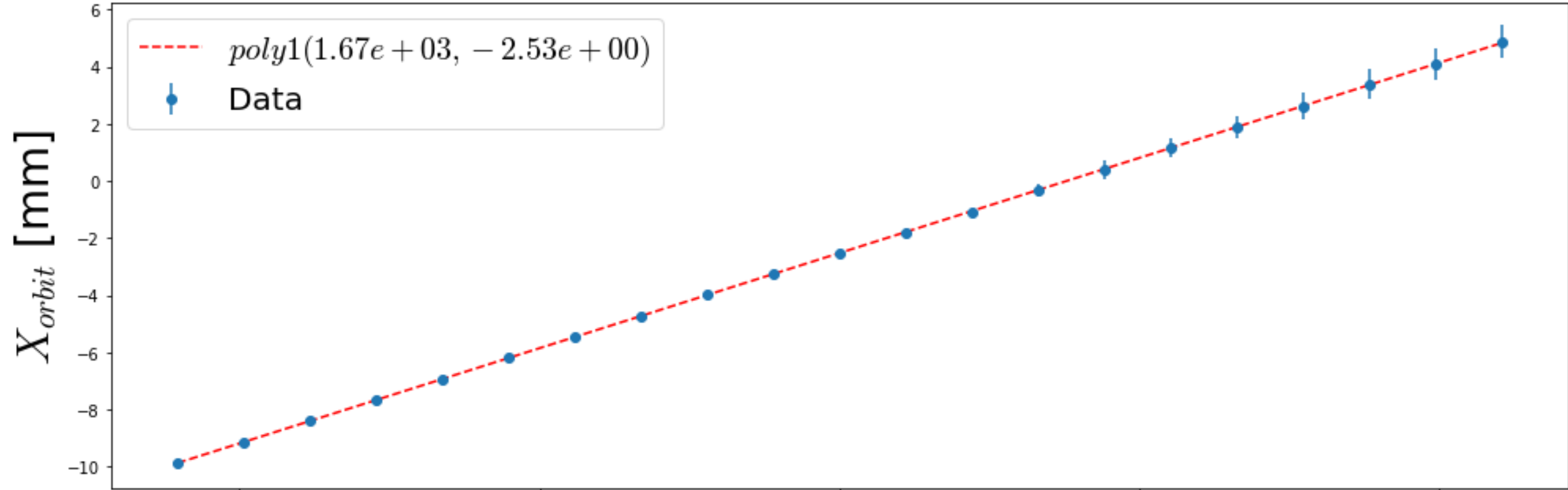
Beta functions (ON-MOMENTUM)

Measurement 0 in rre0_sq504Compare_100821.tbt



10/08/2021

Dispersion functions (ON-MOMENTUM)



$$\Delta\delta = \frac{\Delta f}{f_{rev} h \eta}$$