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Measurements during beam loss

Levon and Greg

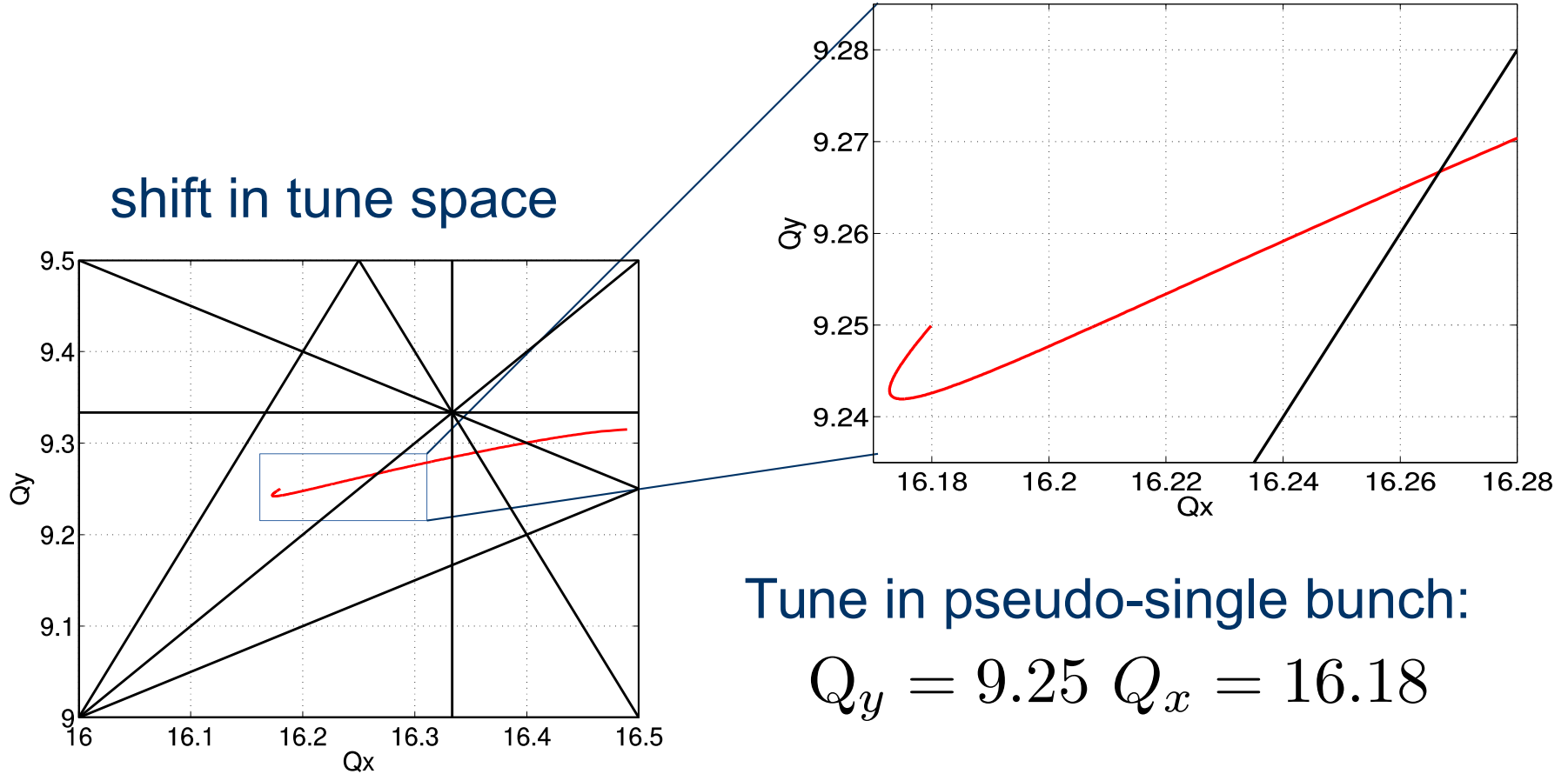
Tune Measurements during RF failure

22 April 2015

Things to consider during RF caused beam loss

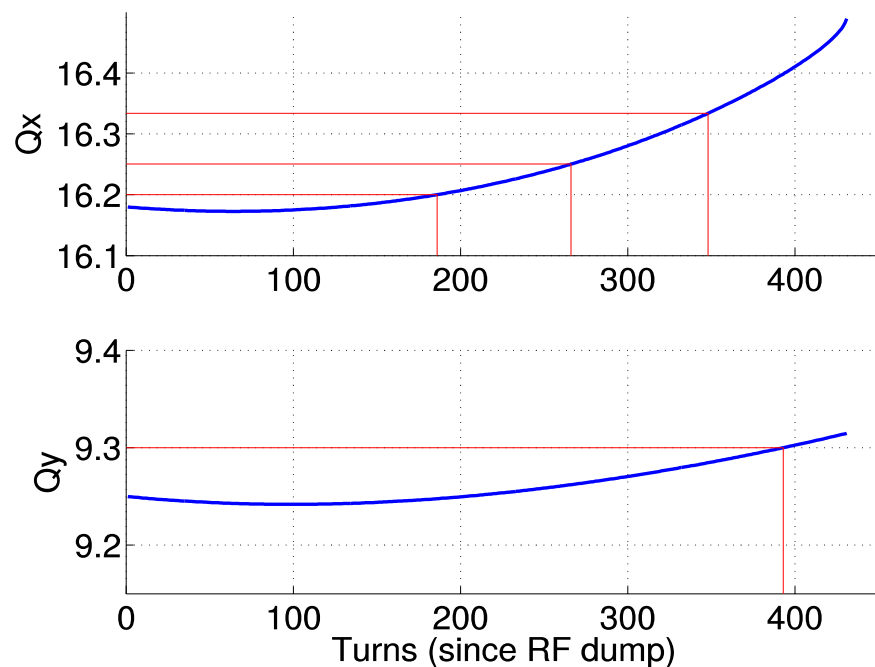
- Beam loss happens very fast
 - Only a few hundred turns available to analyze
 - Further limited by FFT resolution
- Beam energy loss
 - Energy deviation causes a tune shift
 - $Q = Q_0 + \xi_1 \left(\frac{\Delta p}{p} \right) + \xi_2 \left(\frac{\Delta p}{p} \right)^2 + \dots$
- Beam excitation
 - Can't measure tune without beam excitation

Simulated tune shift with RF loss

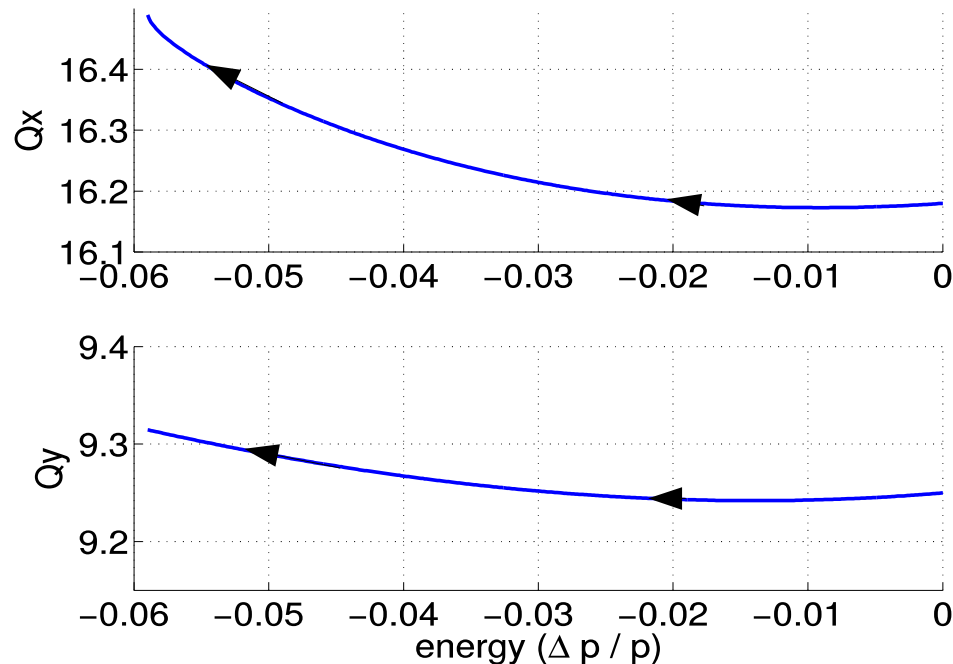


Simulated tune shift with RF loss

Turns with shift

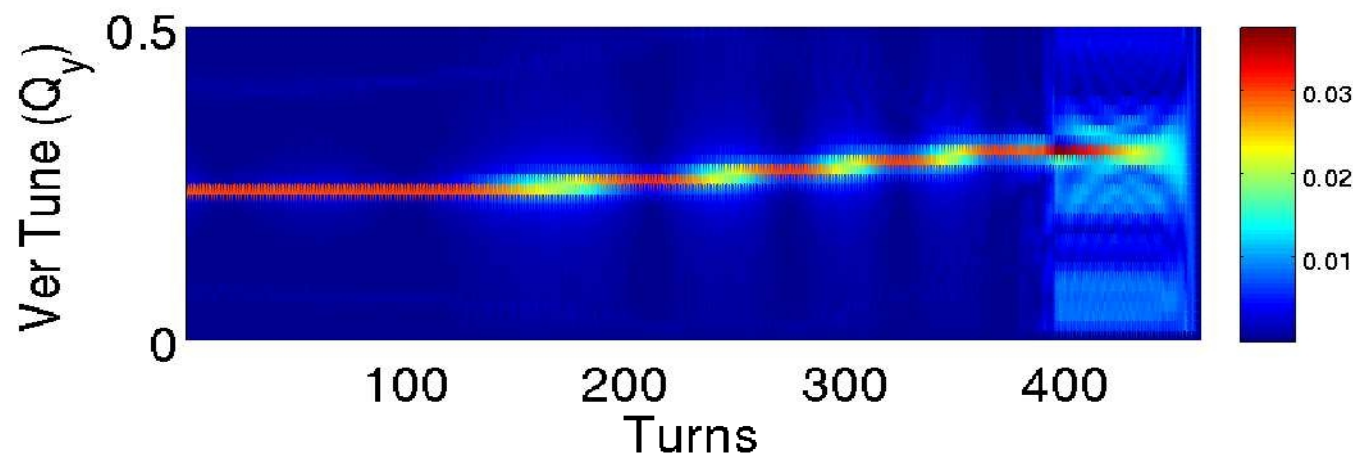
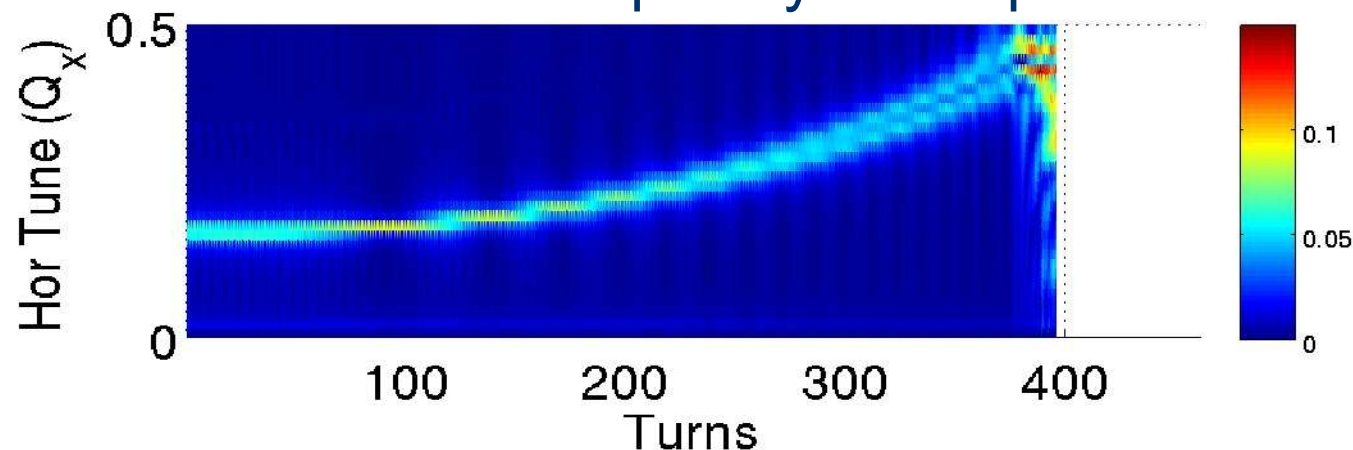


Energy with shift



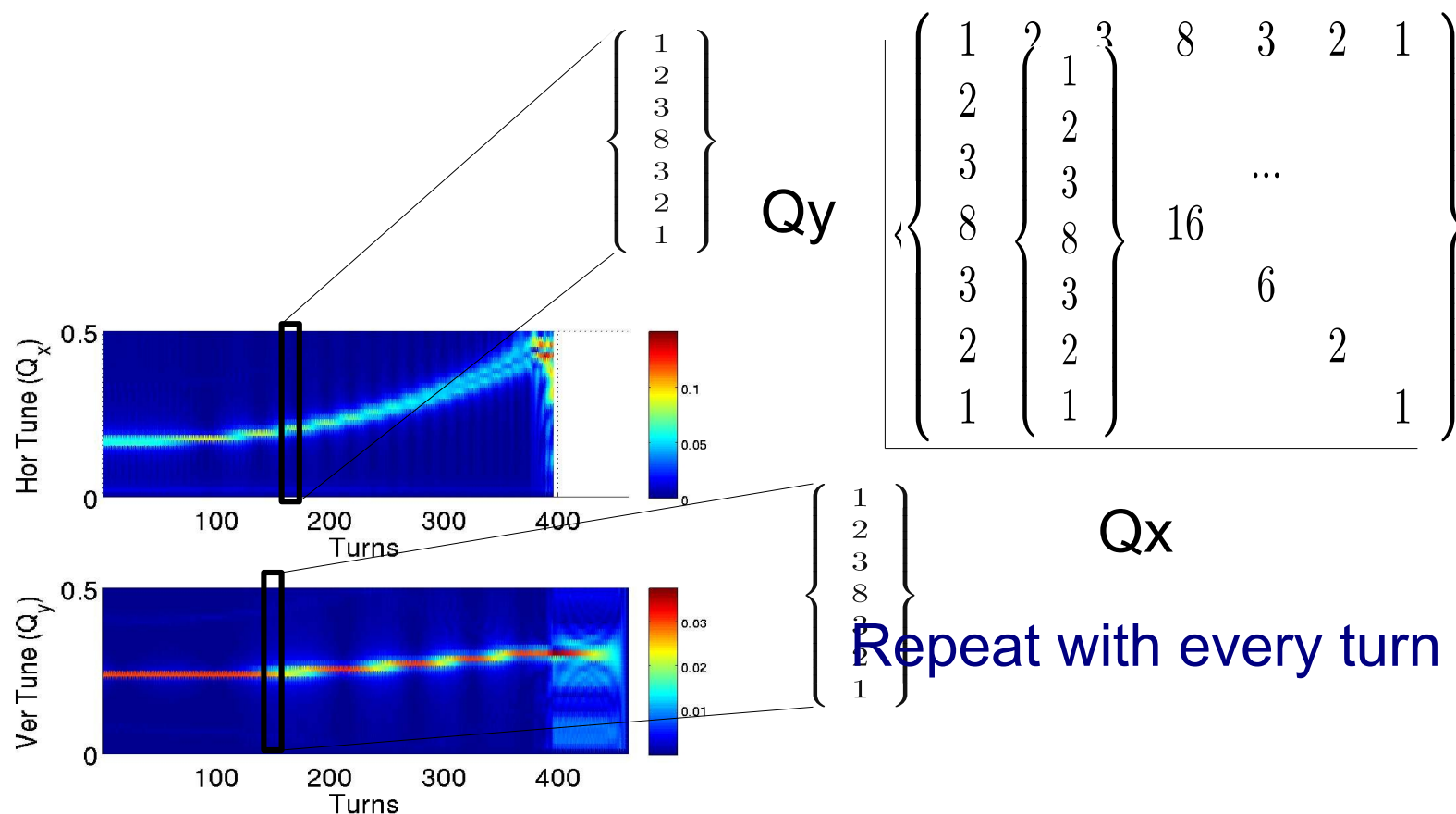
Simulated tune shift with RF loss

Time vs Frequency vs Amplitude



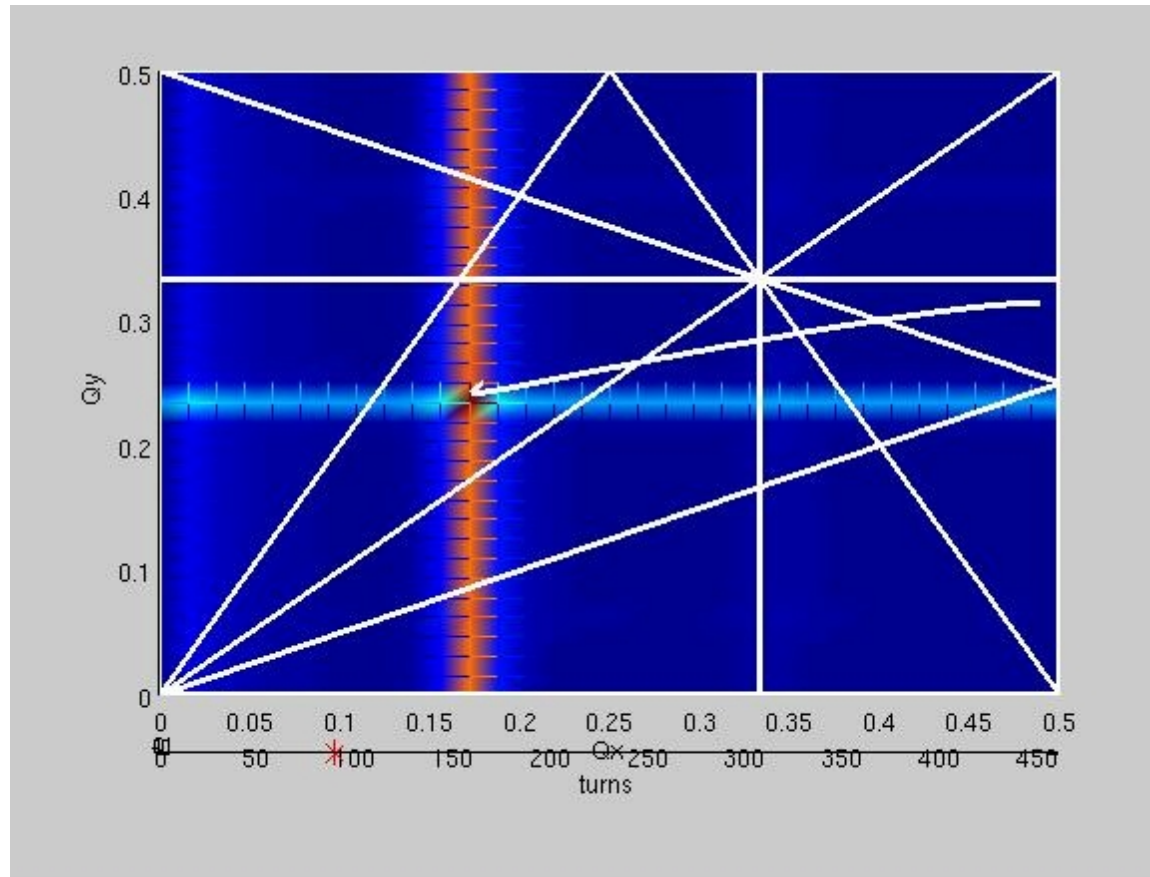
Simulated tune shift with RF loss

Qx vs Qy vs amplitude vs time



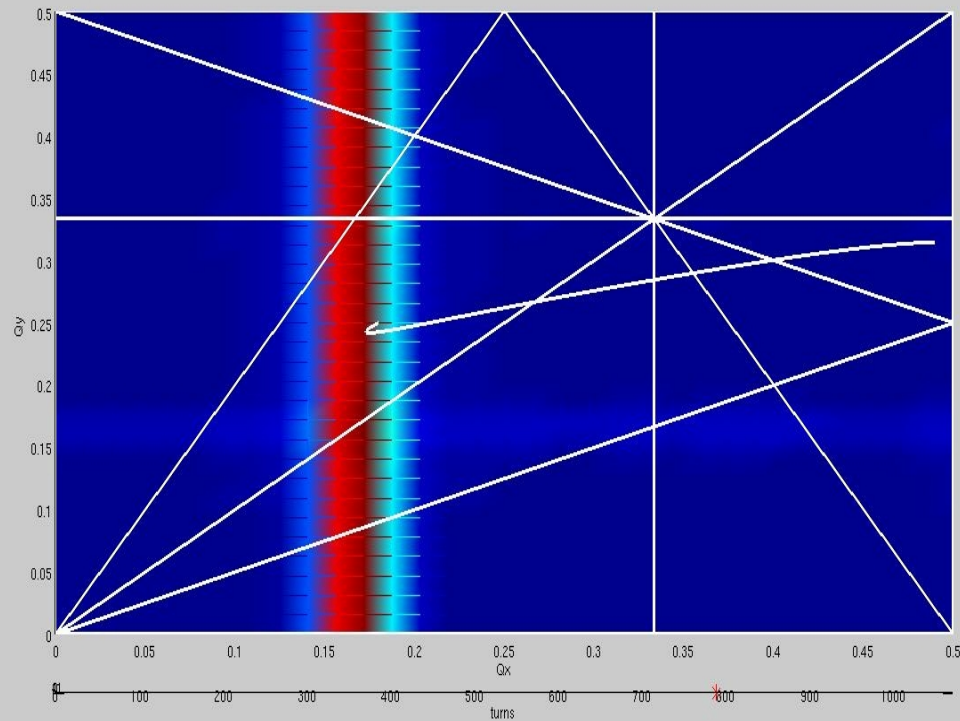
Simulated tune shift with RF dump

Q_x vs Q_y vs amplitude vs time



Real tune shift with RF dump

Qx vs Qy vs amplitude vs time



What's next?

- Measurements with strung together BPMs
 - Allows for tune measurements with less turns
- Any suggestions or advice would be greatly appreciated!

Thank you!