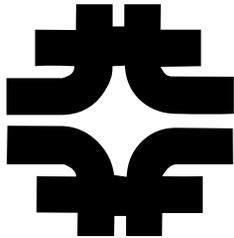


TevTuneTracker: January 7 2002 Parasitic Study

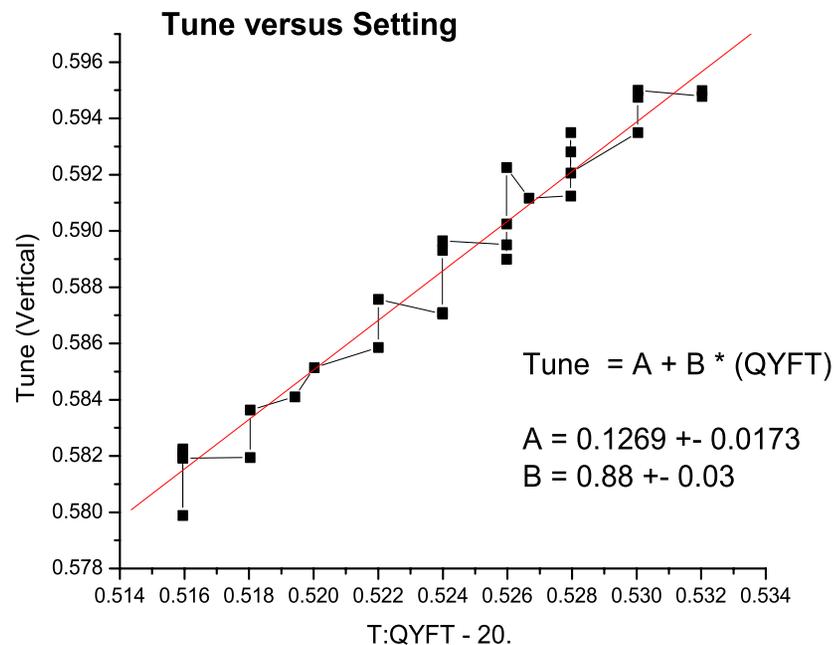
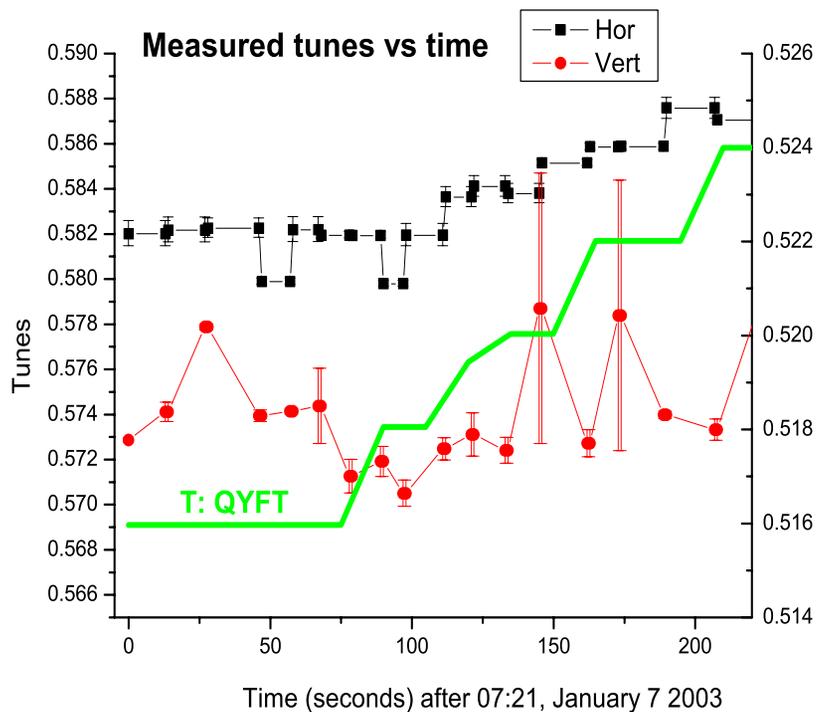


Paul Lebrun

Fermilab

January 9 2002

While Changing T:QYFT,

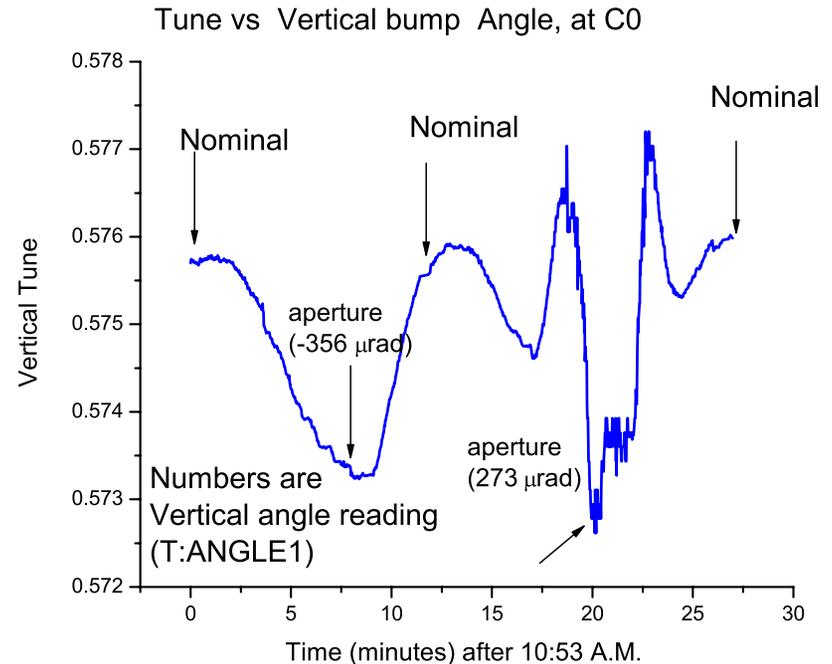
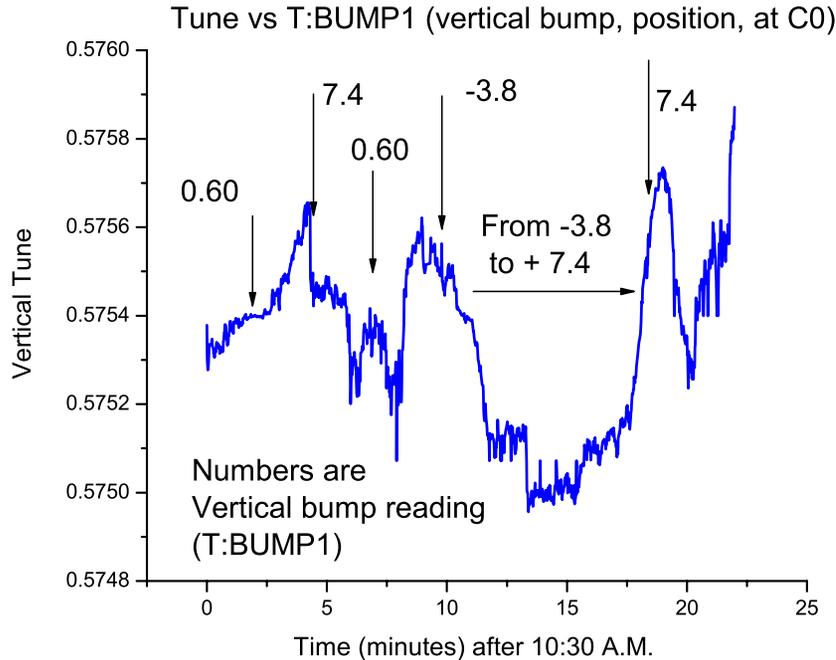


- Datalogging the tunes, setting vs measured. *Parasitically..*

While Changing T:QYFT, Caveats...

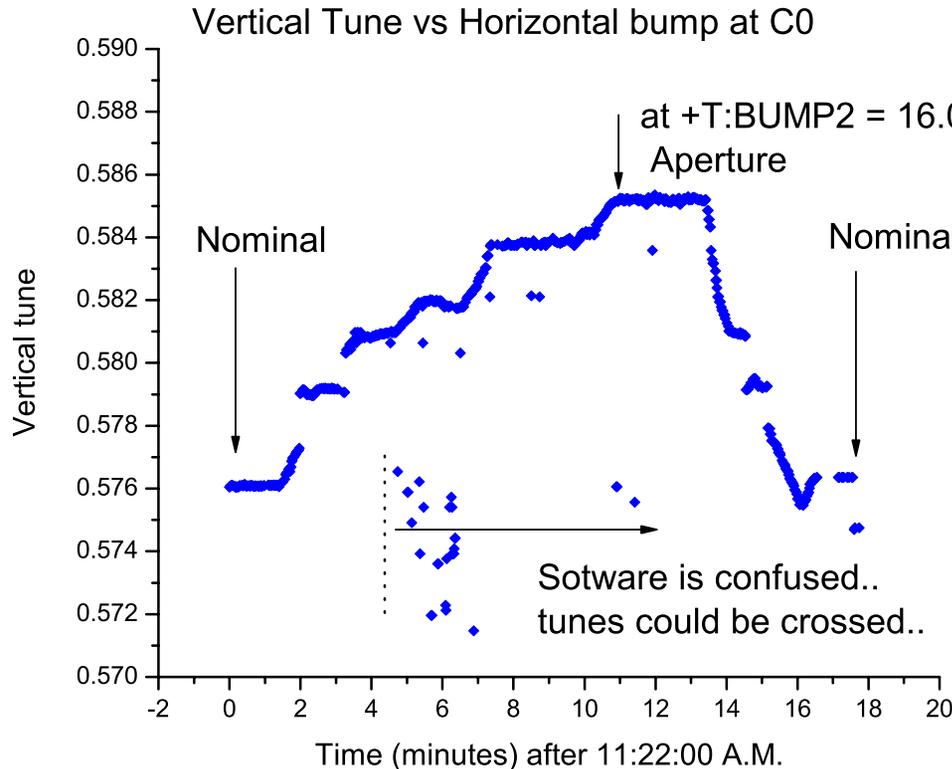
- Taken with Coalesced beam, only two bunches in the machines (~ 140 e9 and ~ 57 e9) Evidently, because of finite chromaticity and larger $\delta p/p$, it is harder to measure the tunes than with coalesced beam.
- X & Y are flipped! This is because the software, currently, always assigns the *highest* tune to the Horizontal plane. During the scan, the tunes did cross (many times) Two distinct way to fix this: (a good one, and a bad one)
 - Analyze both planes *concurrently* and arbitrate which plane is which based on relative intensities on the lines. To implement this:
 - Minor software upgrade
 - An other Spectrum Analyzer, and corresponding D.A.
 - Twice the CPU power, to keep up..
 - Keep track of the entire history, so that we count the number of tunes crossing. This is difficult, it won't be reliable, especially if the tunes stay very close to each others for long periods of time. Bad idea!.
- There is significant delay (~ 15 seconds) between a change of T:QYFT and the tune change. This is a “software delay: it takes ~ 5 second for the “fitCoalesced2 and “fitGhost2” class to spit out there results, per scan, on nova (400 Mhz UltraSparc2 CPU). This is too long. Not counting the D.A. latencies, which are different for T:QYFT and T:TUYYBR. => More CPU's , faster D.A.

Tunes vs Bump position at C0 (Parasitic)



- **The vertical tune is almost insensitive to the vertical position.. Definitely sensitive to angle bump.**

Vertical Tunes vs Bump position at C0 (Parasitic)



- **Very sensitive to horizontal position.**
- **Caveat (again) : tunes did cross while doing the scan and the software is confused.**

Status...

Need further such exercises, where

Tunes are changed in “calibrated fashion” and checked “by eye” in MCR Ramp and/or Squeeze vsamcr files are analyzed “by hand”, result are compared with TevTuneTracker output.

Could be already exploited.. Tunes are scanned in “unexpected ways”..
(with bumps, sextupoles, ...)

Need to do joined, concurrent analysis of X and Y signals. -> need an other “box”
(most of the software written..)

For Uncoalesced beams, almost ready to think about a pre-prototype software that would correct T:QYFT (or T:QXFT), dynamically, as the tunes drifts immediately after a store (without 6 ramp/squeeze, for instance)