

Skew Quadrupole Modulation Beam Experiment

(7th session, March 26, 2004)

Plan for this session

- 1) to check the projection ratios from Roger's on line program
- 2) use Roger's on line program to do measurement
- 3) try again the coupling correction at injection

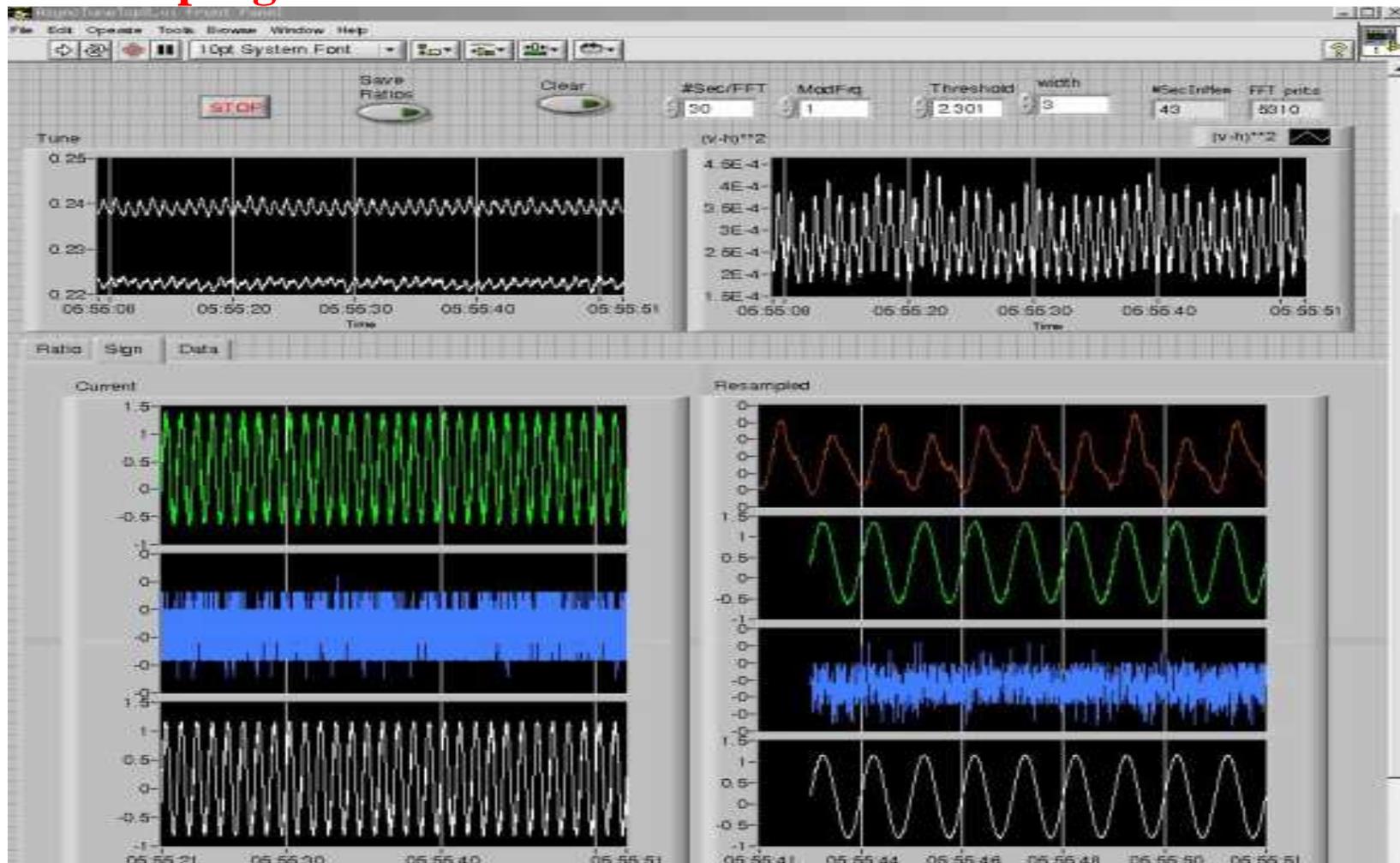
What had been done

- 1) checked Roger's program
- 2) one quick coupling measurement and correction (NOT successful)

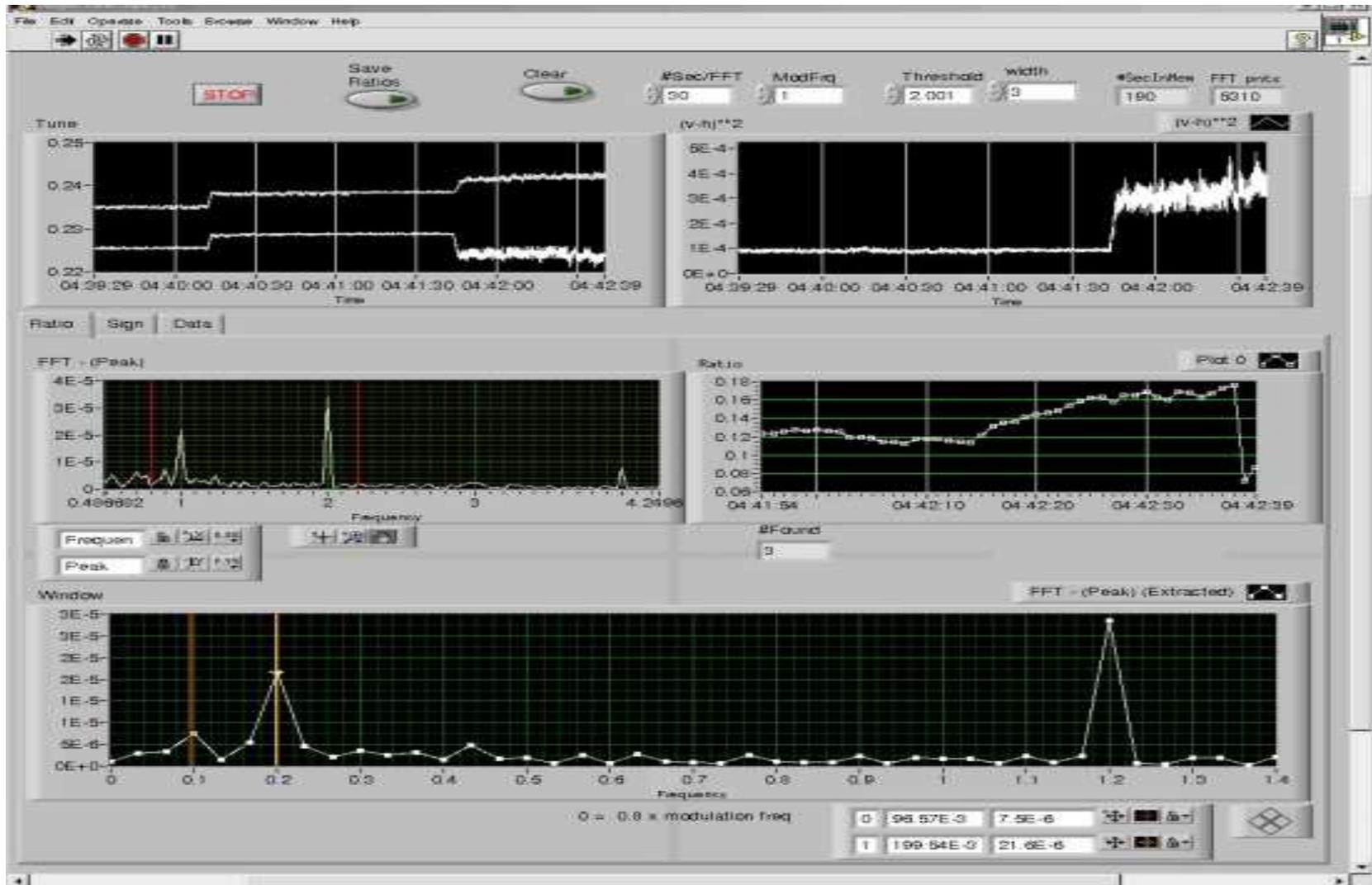
Problems

- 1) Roger still need work on his program
To pick out the right peaks , to add the sign processing part in
- 2) experiment depends on good PLL working condition
at injection, on ramp
PLL is the KEY factor for the skewQ modulation measurement

On line program



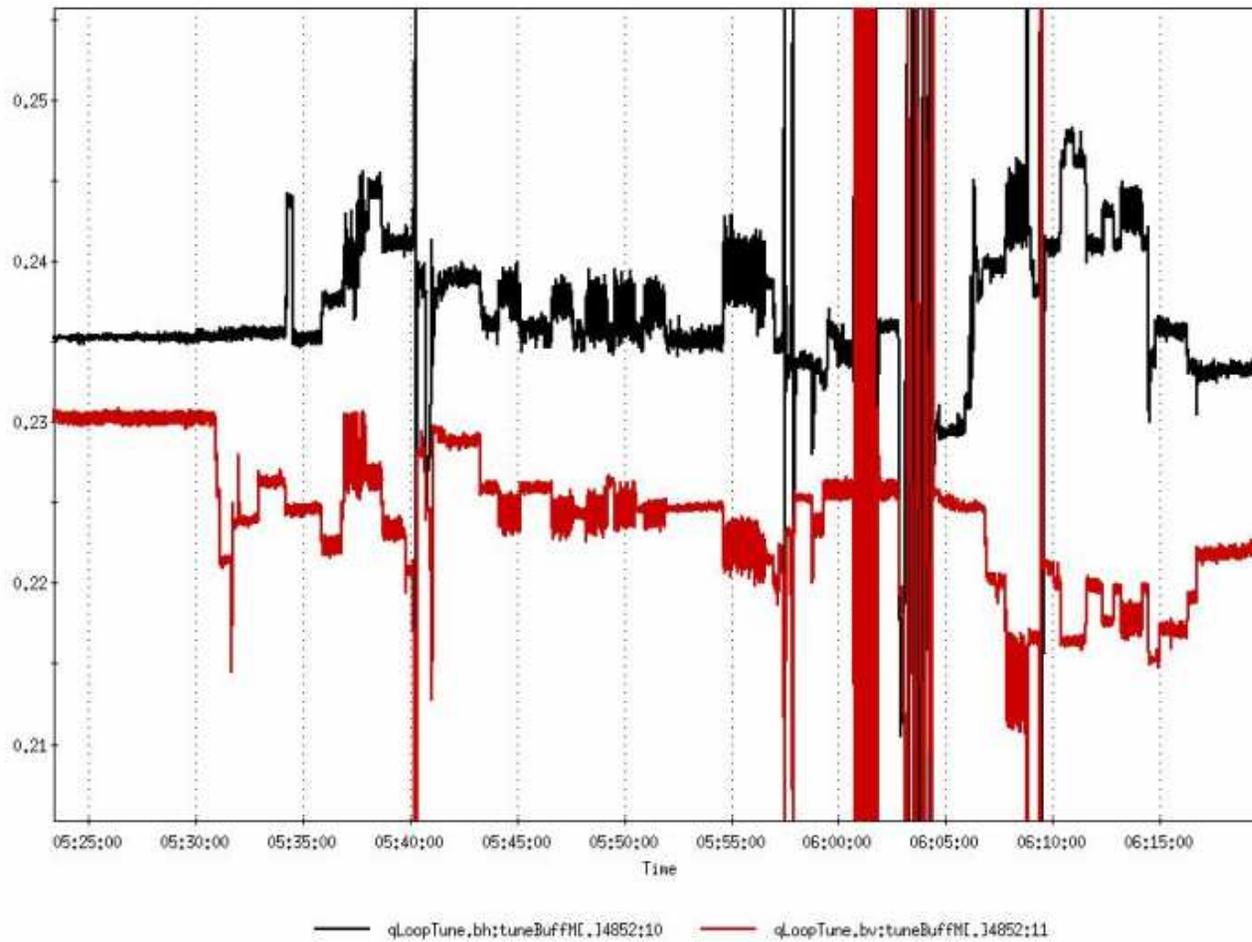
Picture 1



Picture 2

PLL data

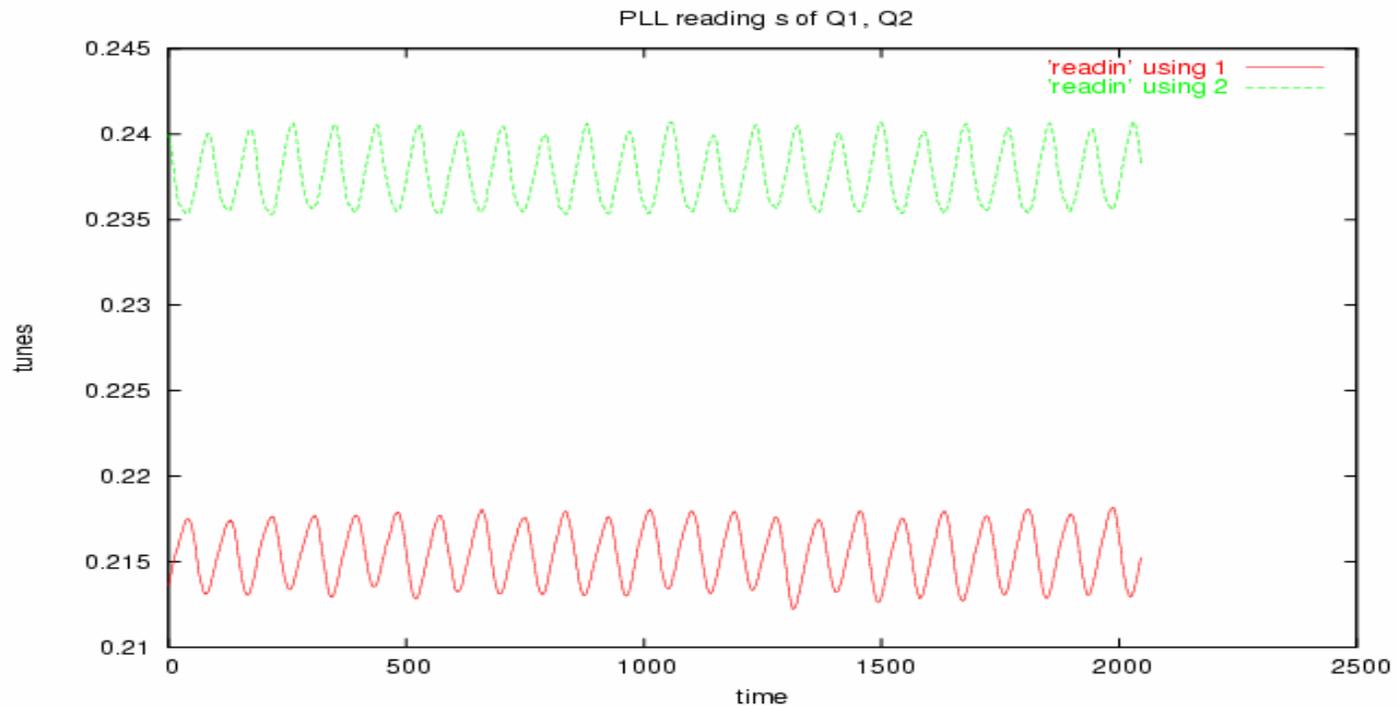
Data on Monday



a

what PLL data's quality is good

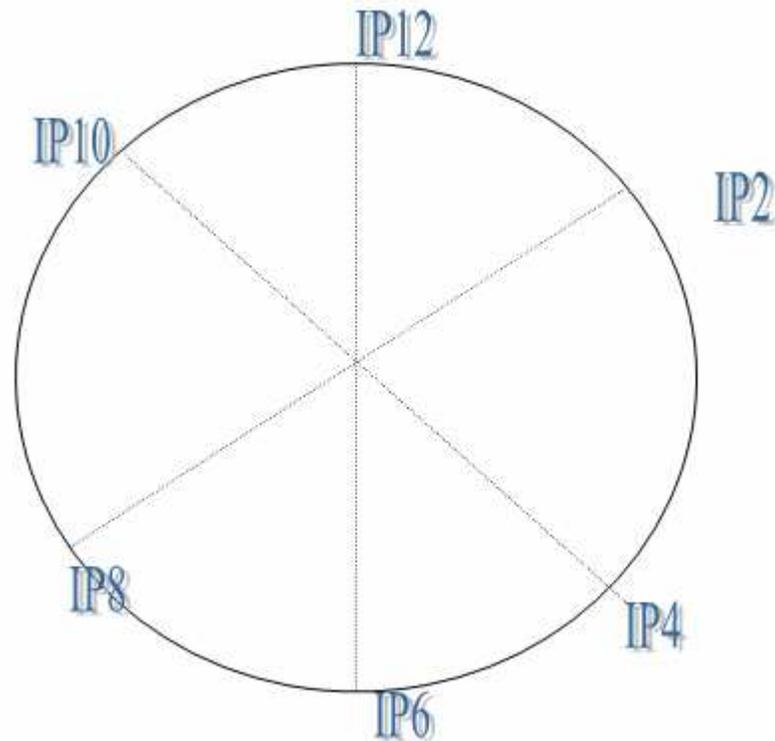
Zoom of PLL data



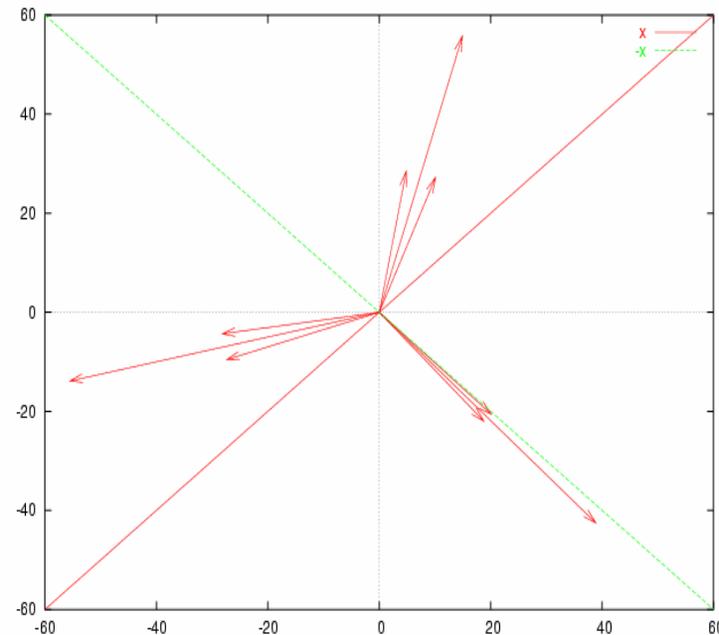
eigtune's curve is smooth, repeatable and Q1 and Q2 's p-p heights same

The Q1 and Q2 's jumps during the modulation is physical.

Robustness of the phase angle differences between three skewQ families

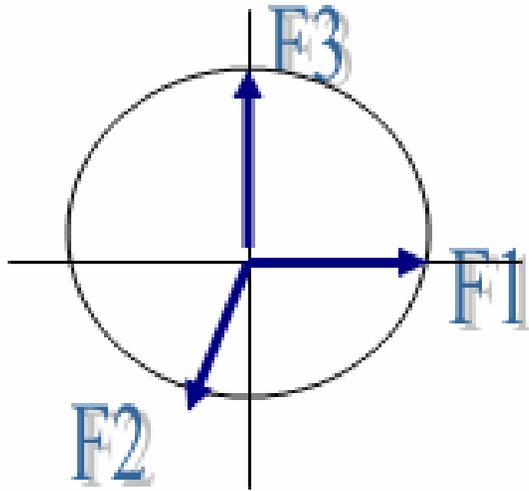


Coupling coefficients at store



- If
- 1) the betatron phase advances in very Quadrant are same, or almost same,
 - 2) Q_x and Q_y digital part difference equals 1
 - 3) Q_x and Q_y decimal part different is very same, <0.01
- the coupling coefficients of the three families are almost 120 degree separated.

Measurement and Correction Simulations



Assuming the residual coupling induced by F2: 0.005 (ks.dl)

Step 1. MEASUREMENT

Modulation skewQ	Projection Ratio
F1(ksdl=0.005)	0.43
F2(ksdl=0.005)	0.91
F3(ksdl=0.005)	0.78

Step2: Correction (F1: $0.43 \cdot 0.005$, F3: $0.78 \cdot 0.005$)

Step3: Measurement after correction

Modulation skewQ	Projection Ratio
F1(ksdl=0.005)	0.04
F2(ksdl=0.005)	0.10
F3(ksdl=0.005)	0.07

Iteration is welcome

Step4: repeat again:

Measurement after second correction

Modulation skewQ	Projection Ratio
F1(ksdl=0.005)	0.0032
F2(ksdl=0.005)	0.033
F3(ksdl=0.005)	0.0050

For small coupling, use small modulation amplitude.