"Some" LHC Schottky Measurements

R. Calaga, T. Pieloni
CM16, May 16-18, 2011
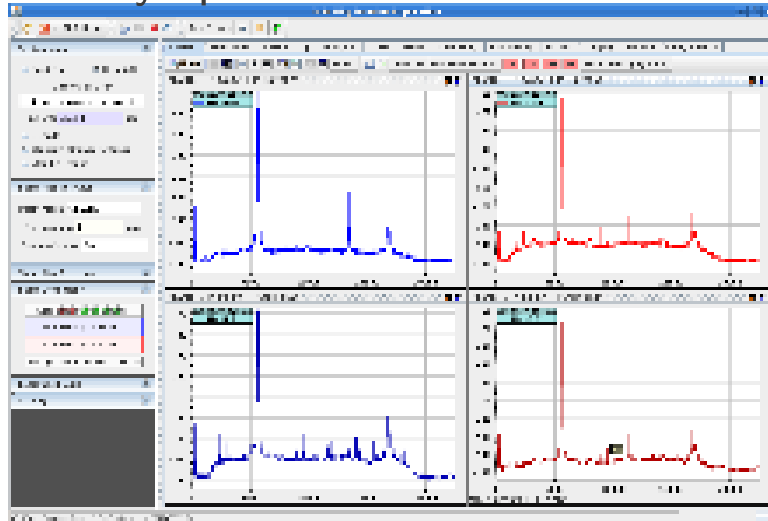
- Introduction

- 3 measurements examples from 2010-11

- Status and future

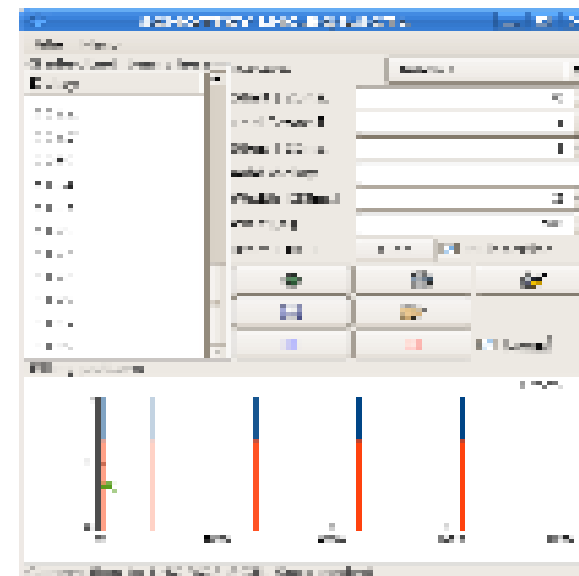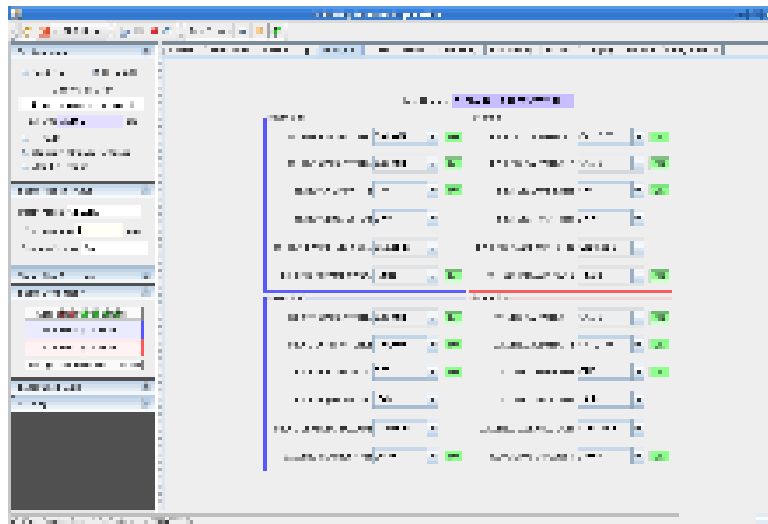# LHC Schottky GUI (old version)
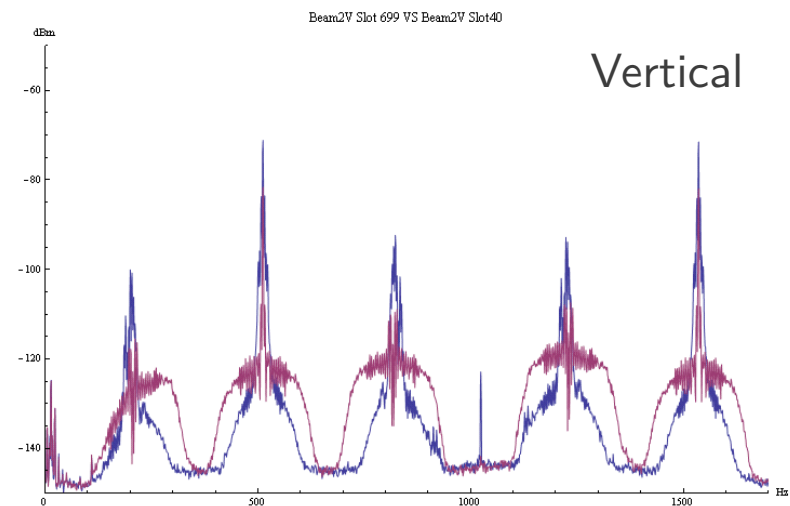
Schottky spectrum

Bunch display (manual selection)
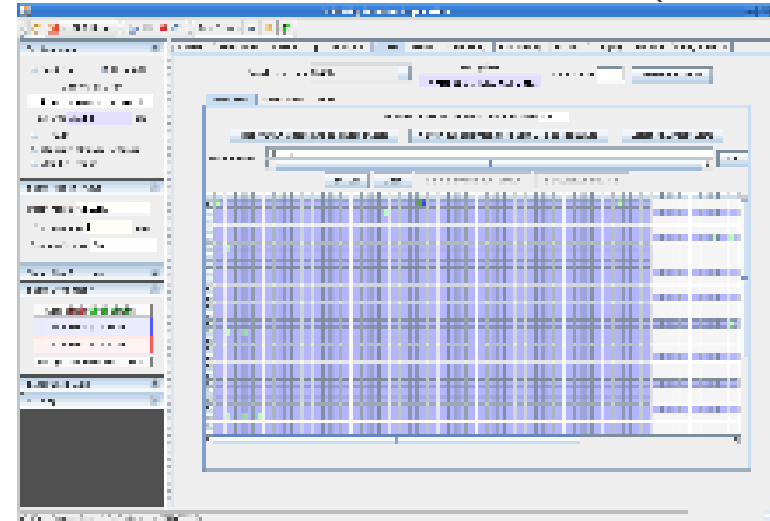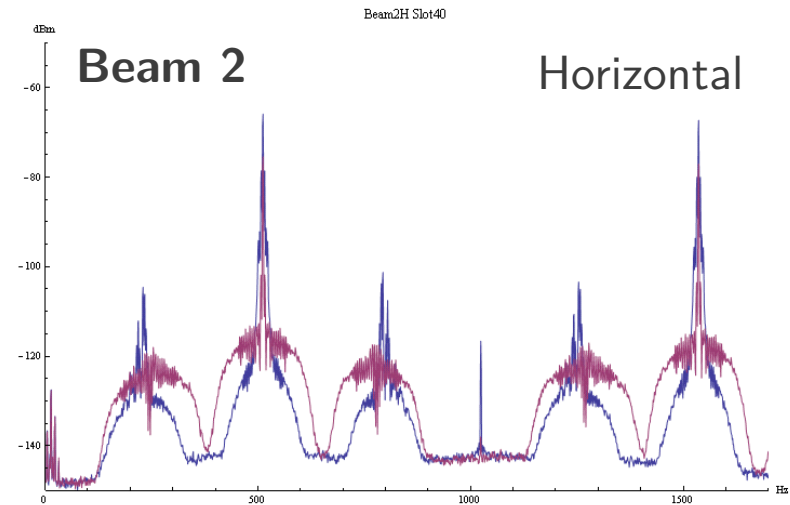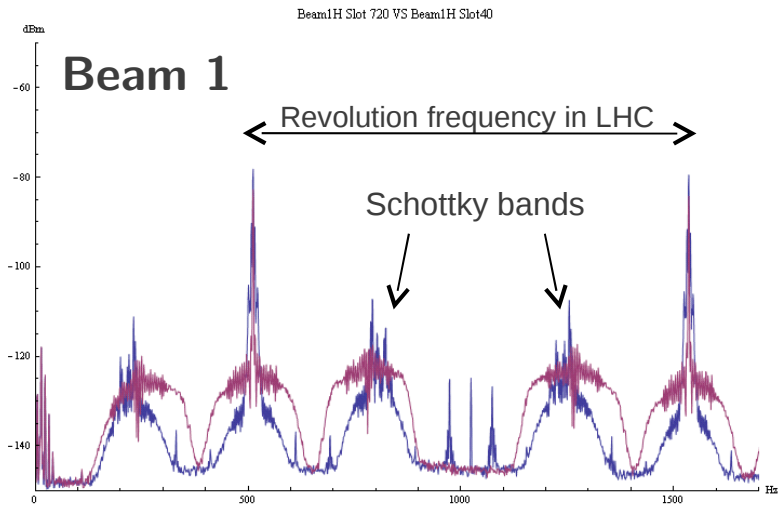
Old Playlist (E. Bravin)

LHC Schottky Spectra

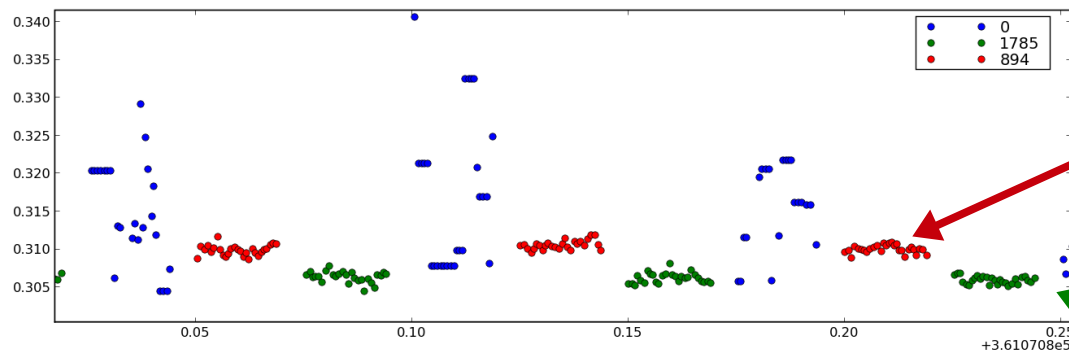Bunch by bunch spectra (stable beams)
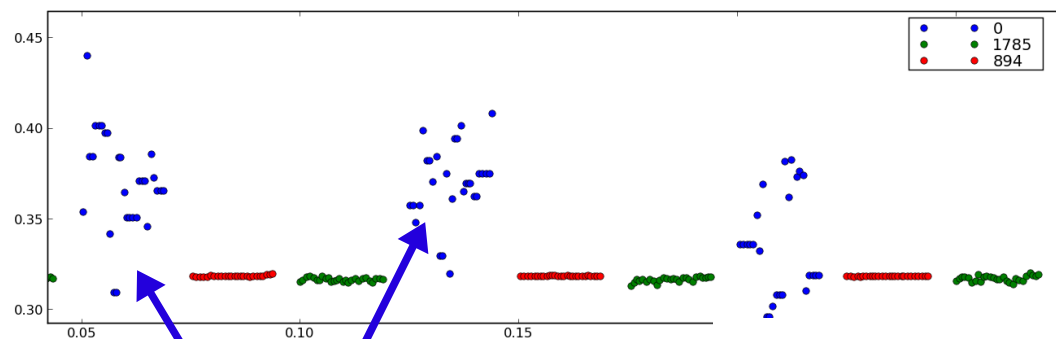
- Protons
- Ions

T. Lefevre, Evian 2010
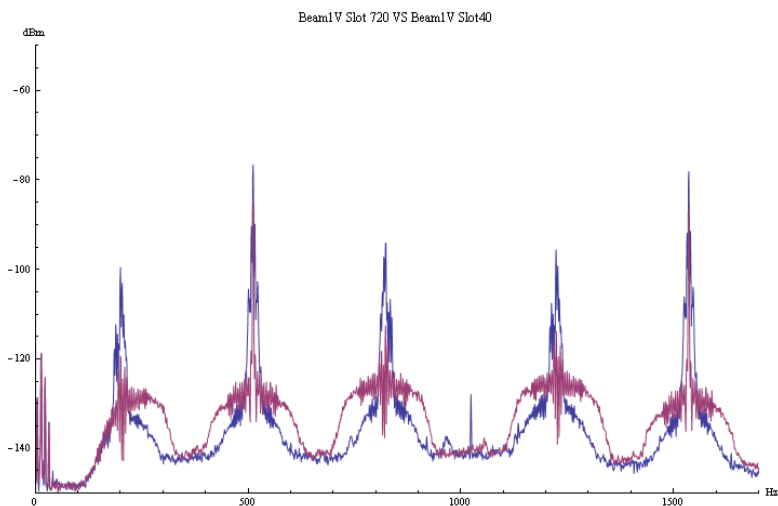
Beam-Beam, 3x3 Bunches

Bunches with 1 collision ALICE

Bunches with 2 collision ATLAS/CMS

Bunch intensities: $\sim 1.15 \times 10^{11}$

Bunch 1785

Tune shift (2 IPs)

Pilot bunch (noisy)
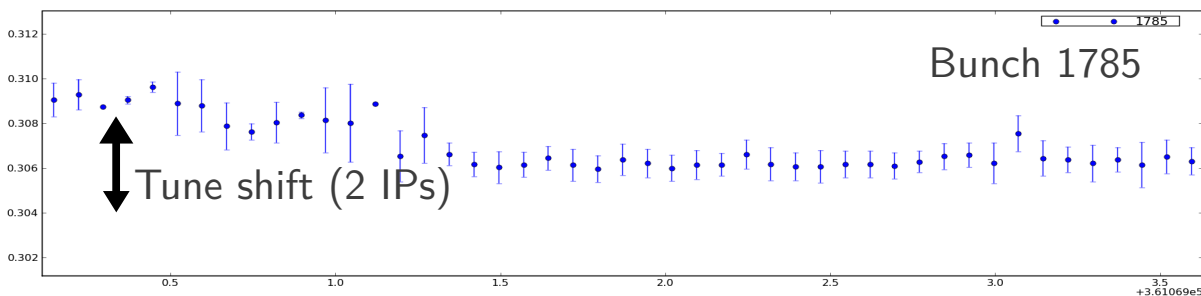
1st collisions of 2011 (Mar 11)
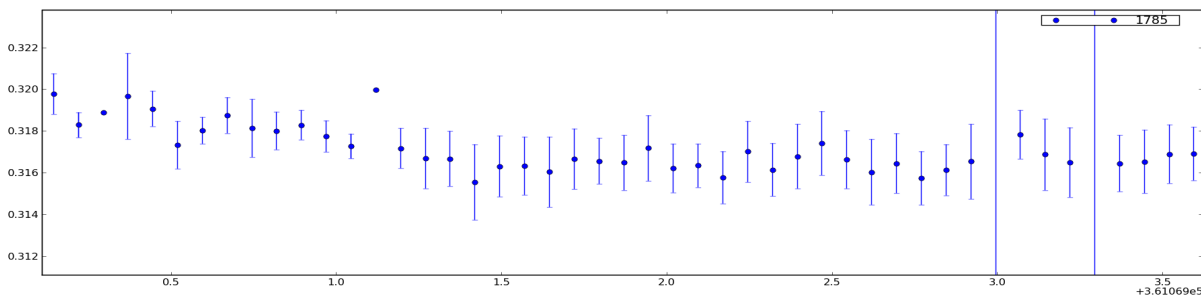
Schottky: Scrubbing Run

Apr 6-12, 2011

12b + 1008b (36bx36b x14)

E. Metral, LBOC Presentation

Scrubbing Run, Fill 1674

Batch 1

Batch 2

Beam 1 Schottky tunes

Beam 2 (extremely noisy)
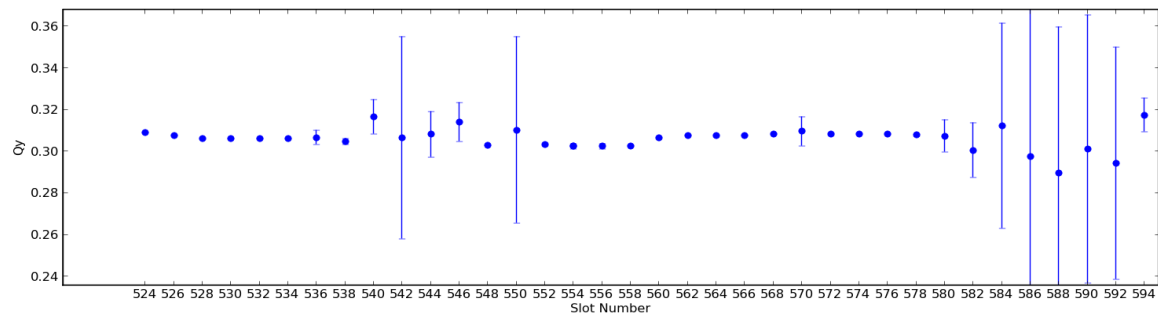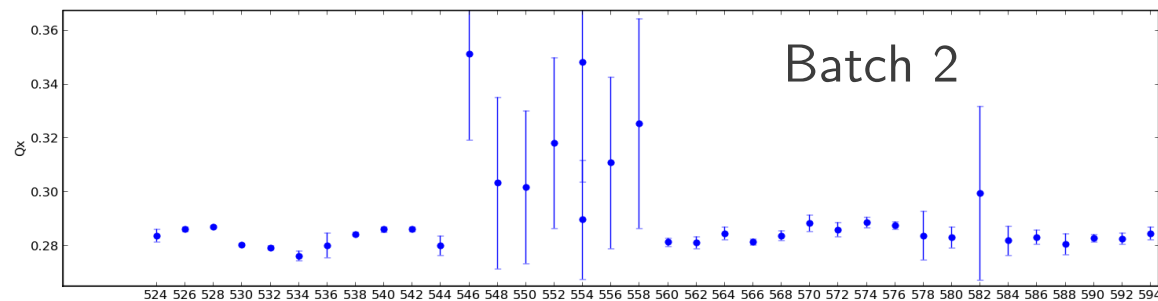
Scrubbing Run, 1689

36b x 11 trains

Before & After | Tune shift along the train

Tune Trim (-0.005)

-0.015

Horizontal

Vertical signal noisy

Vertical
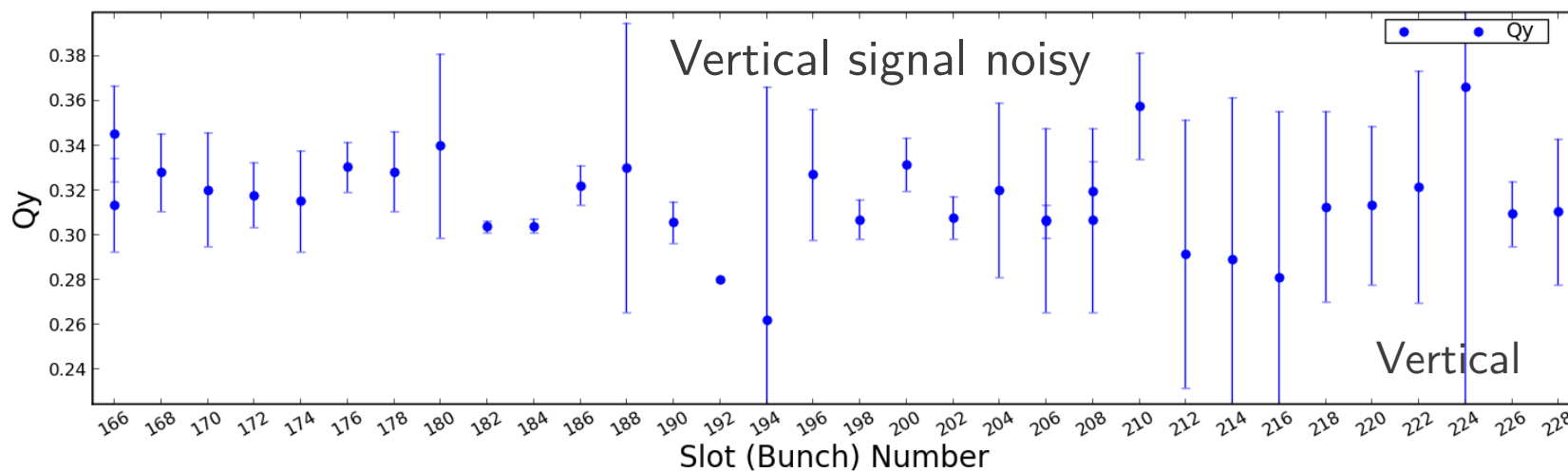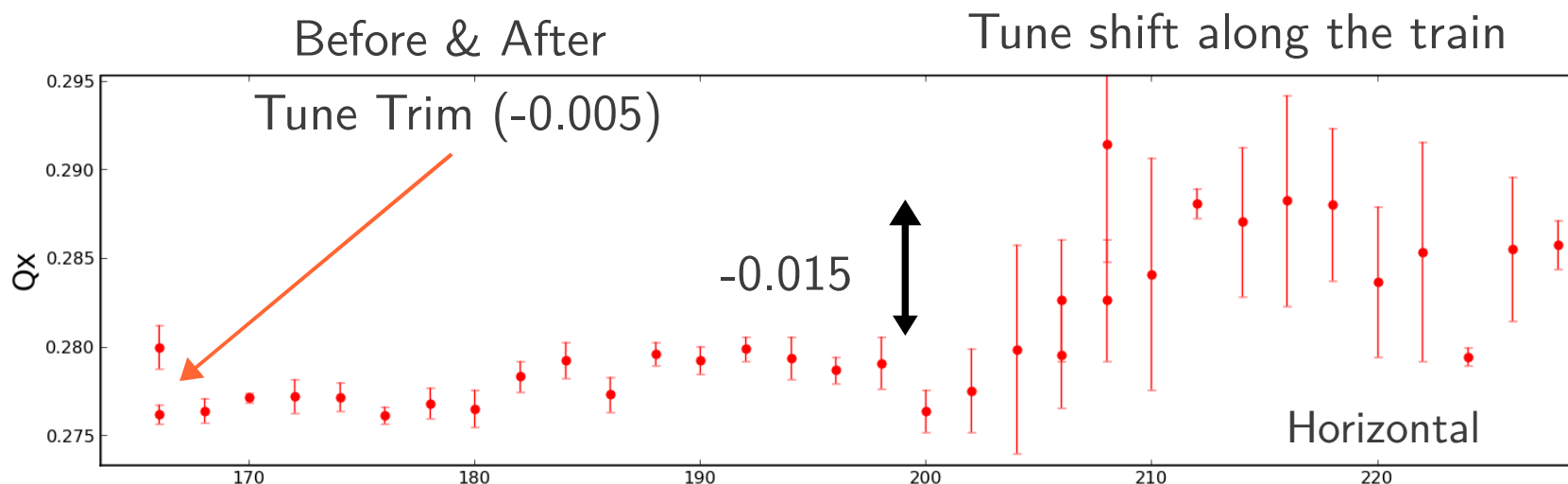
Slot (Bunch) Number

Bunch Number along 1st train

Beam-Beam Exp, BBQ

BBQ Signals
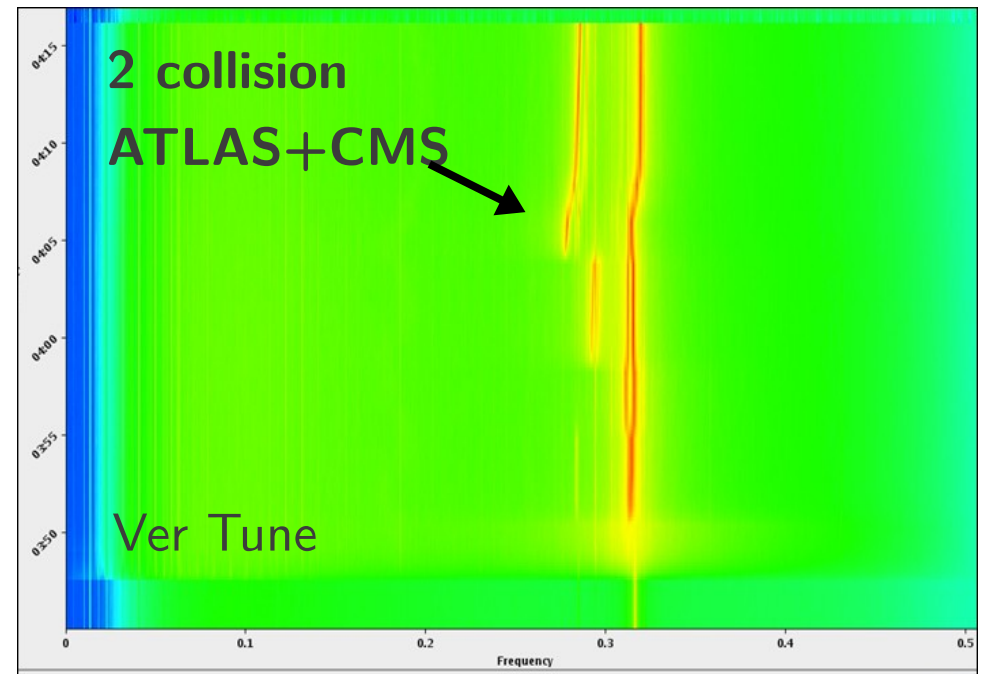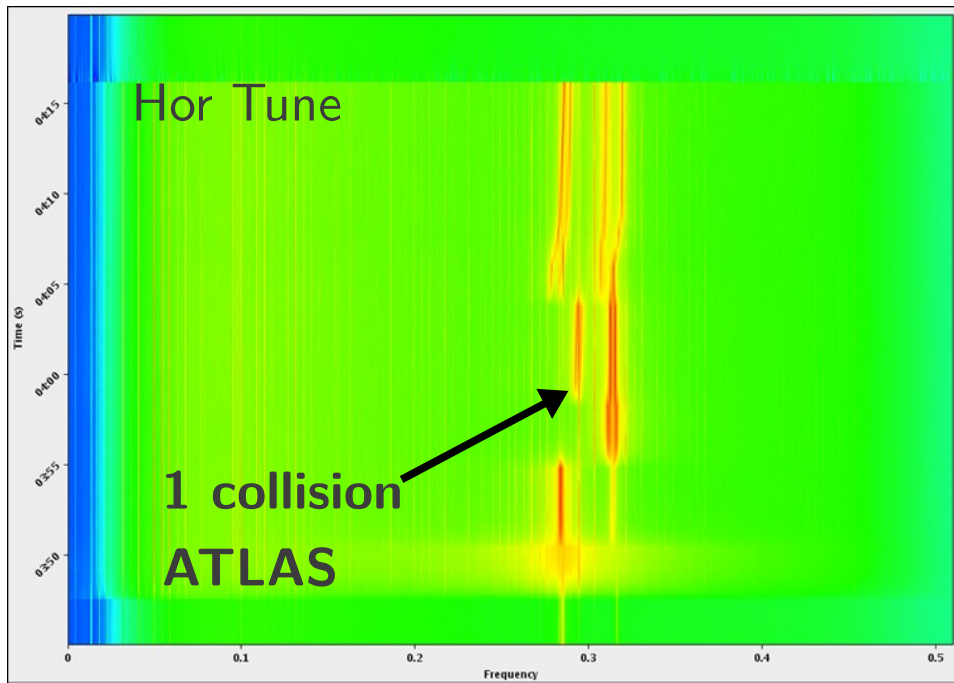
Bunch intensities: ~1.9x10^{11}

Emittances (x,y): ~1.3μm

Beam-beam tune shift > 0.015/IP

Schottky signal noisy

W. Herr et al.

Beam-Beam Exp, Schottky
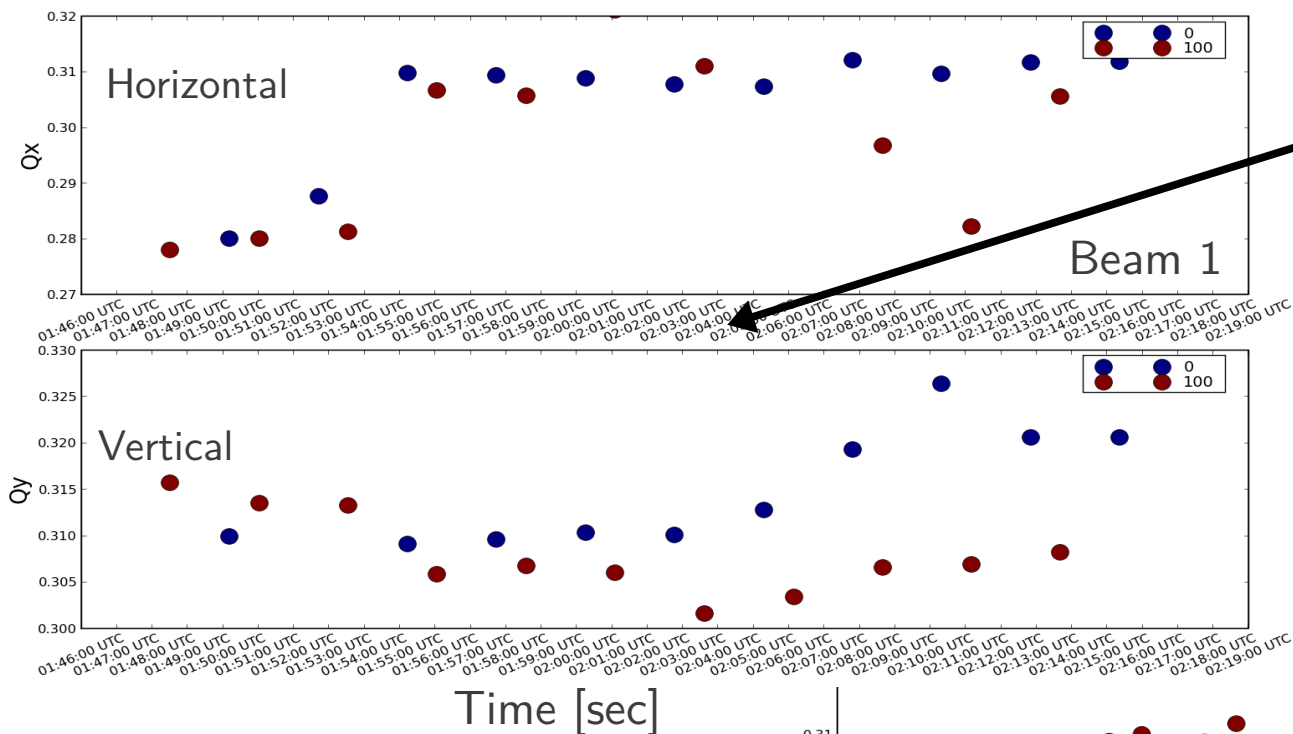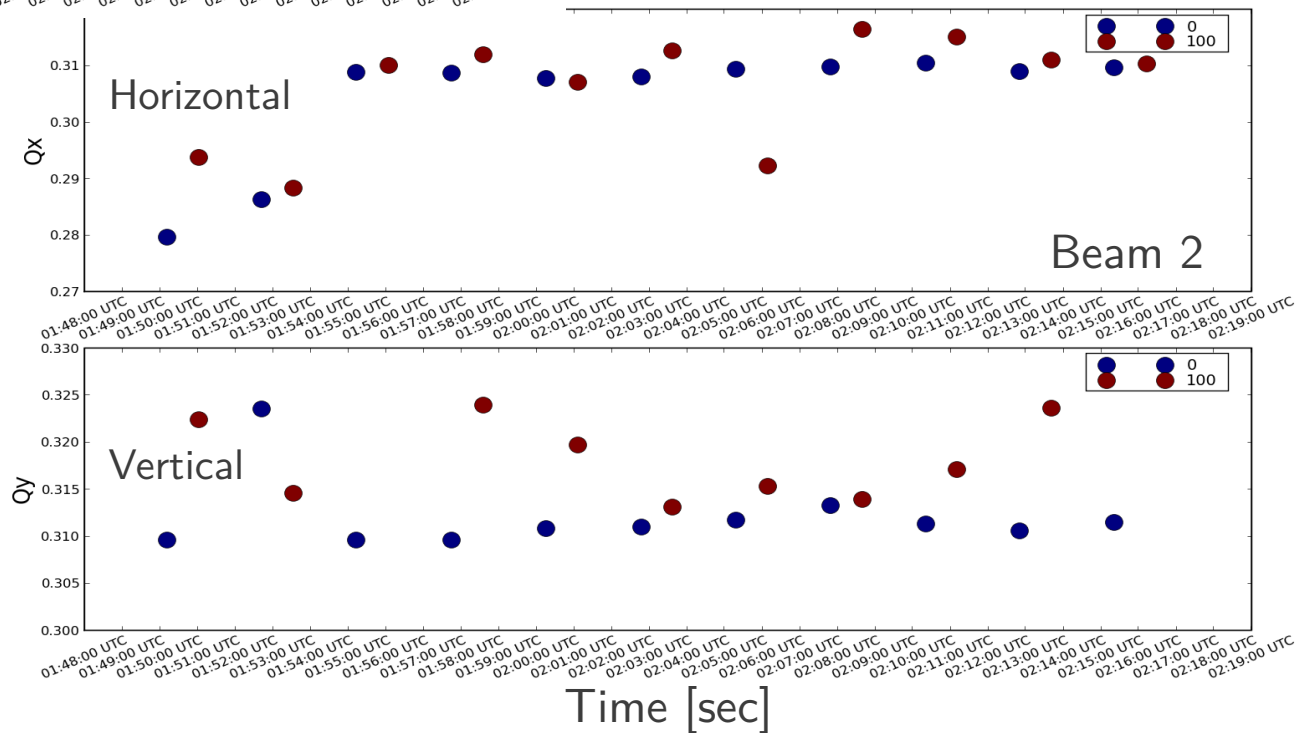
Chromaticity, Pilot bunch

Injection setup for β-beat experiments (Apr 6, 2011)

Schottky Signals

Was following the trim in chrom
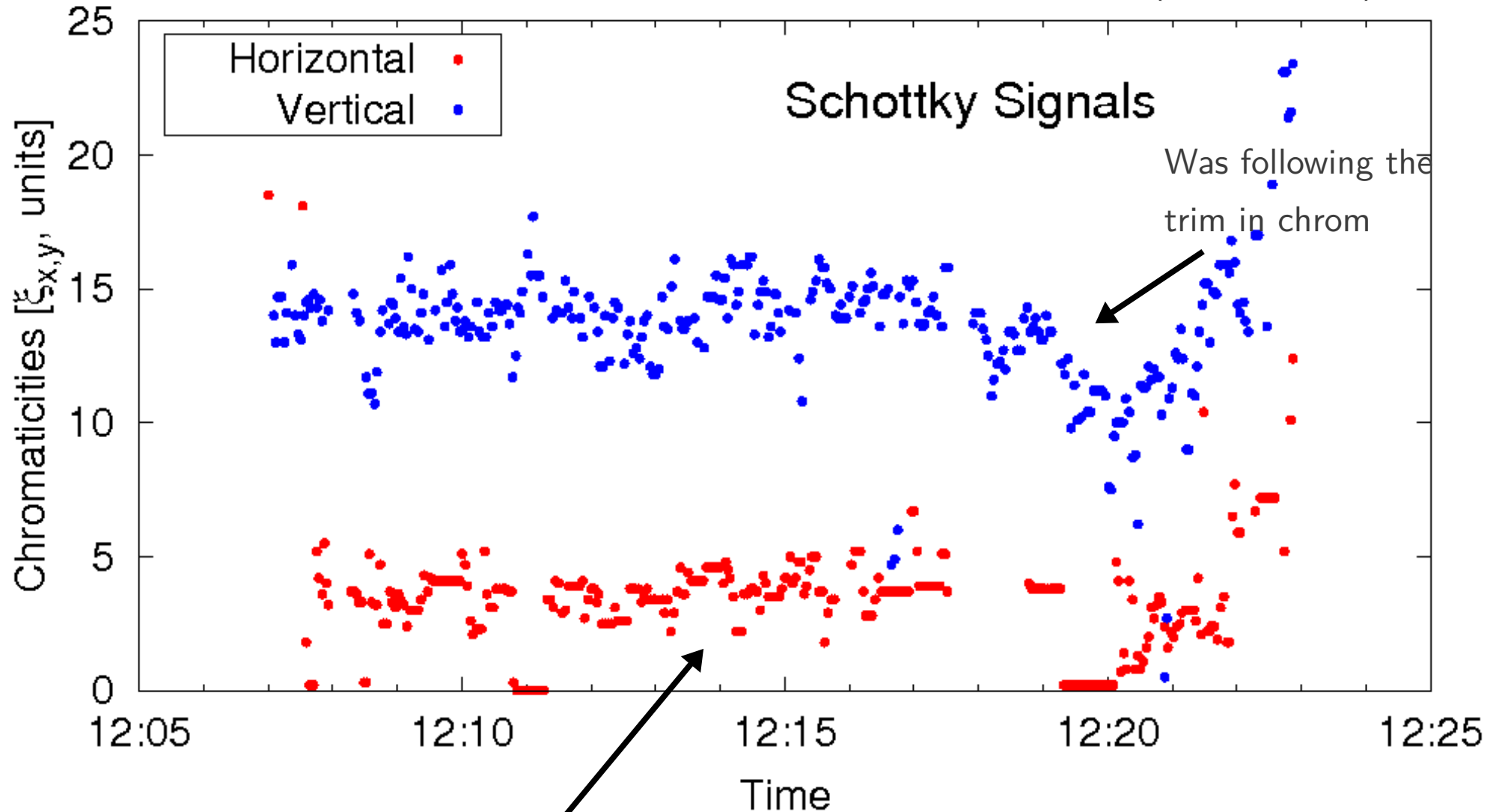
Good chrom measurement for 20 min

Confirmed by classical radial modulation (horizontal, Beam 2)

Discussion, <u>from user point of view</u>

Schottky, powerful & non-invasive tool

- **System**: Decent signals (...sometimes, more reliability)
  - Excellent quality for ions (for protons $\rightarrow$ RF noise & coherent oscillations)
  - Never all signals (B1/B2, H/V, Intensities diff), needs manual input

- **Application**: Significant improvements/tools in 2011
  - Continuous monitoring of bunches & trains (Q, Q'...)

2010-11 Status

- But, still in debugging mode....

Future (?)

- Reliable signals (injection/top energy) $\rightarrow$ OP fixed display
- Less user tweaking $\rightarrow$ leading to <u>operational</u> tool (like BBQ)