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LARP
4.8 GHz LHC Schottky Beam Diagnostic System

Ralph J. Pasquinelli

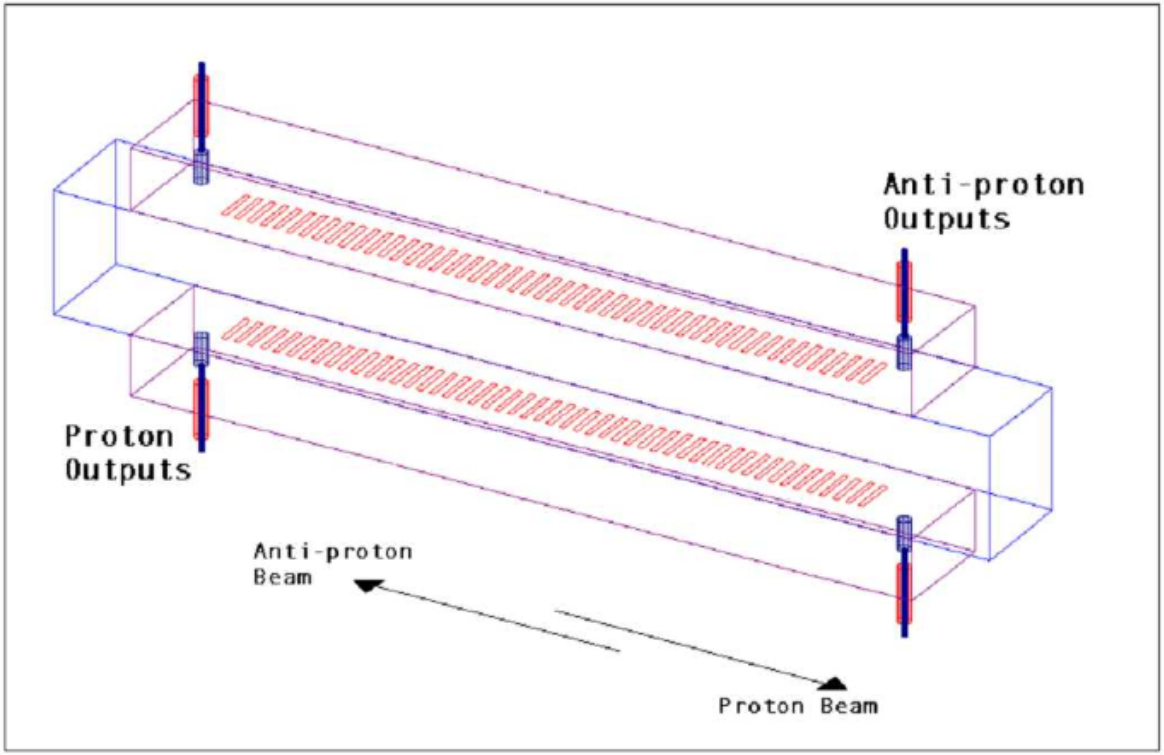
November 8, 2010

All Experimenters Meeting

Tevatron Schottky System Operational 2003

LHC Schottky System Approved by LARP 2004

Slotted Waveguide Pickup



Pickup Designed @ Fermilab in 2005

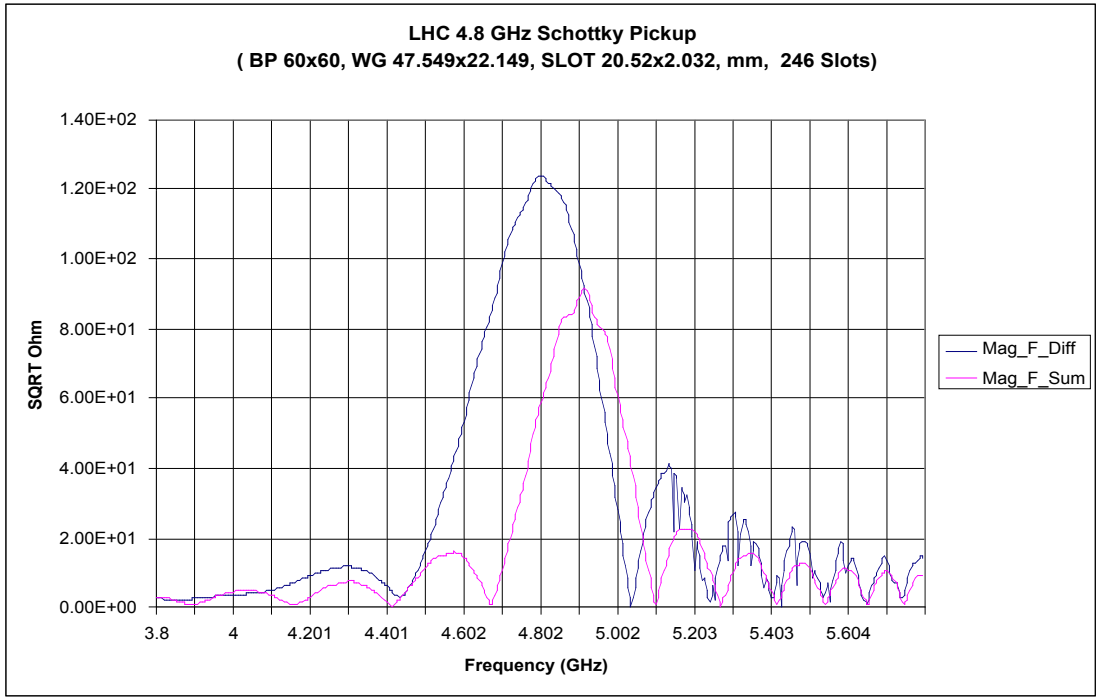


Figure 2. Impedance of LHC Schottky pickup

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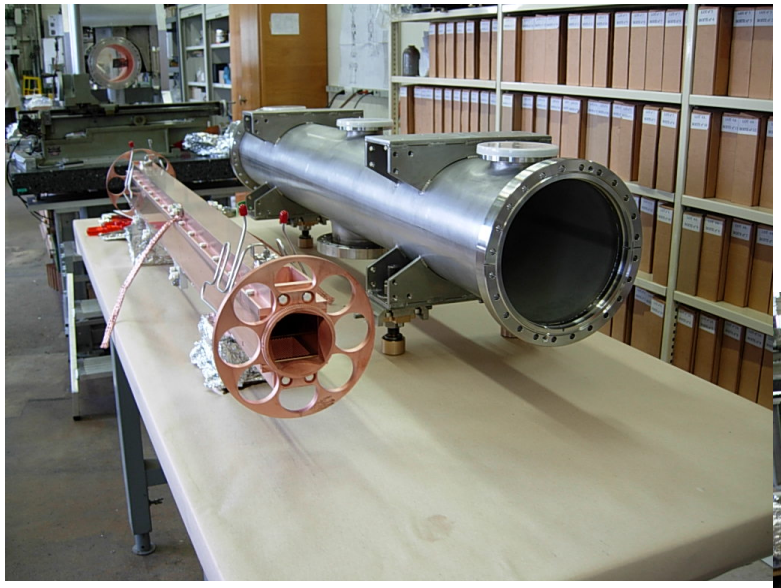

Pickups Fabricated
at CERN Autumn 2006

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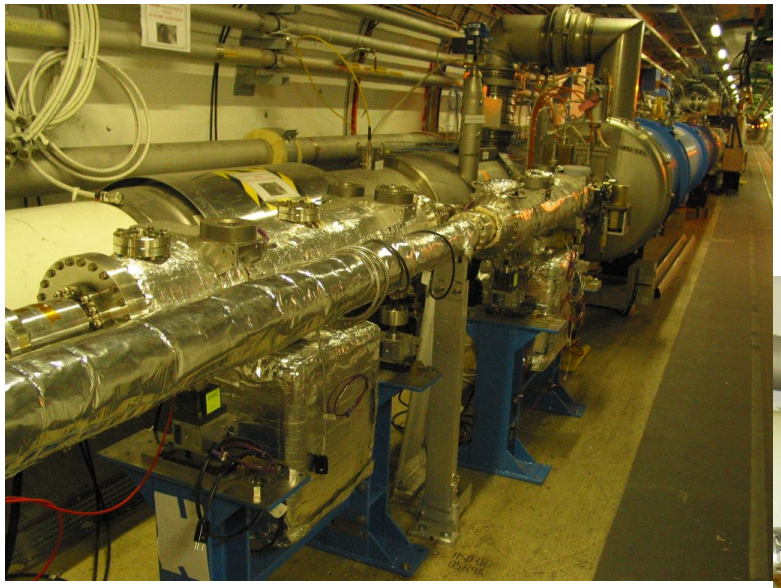
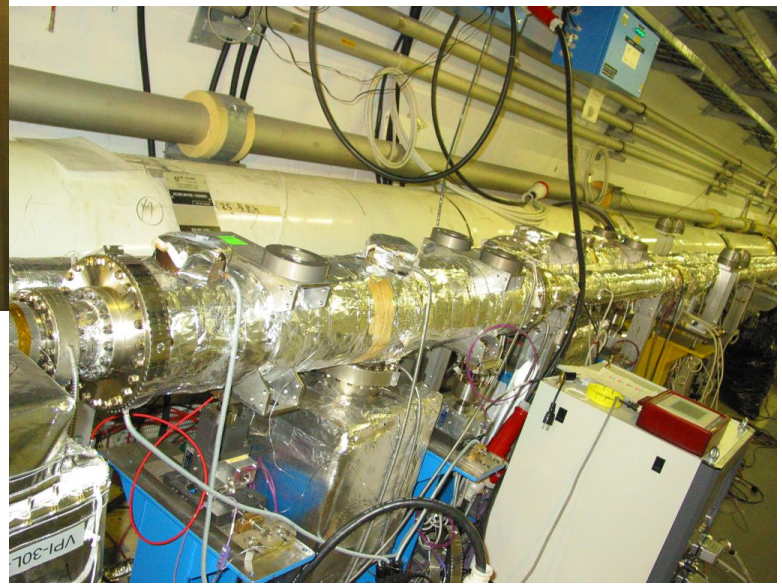
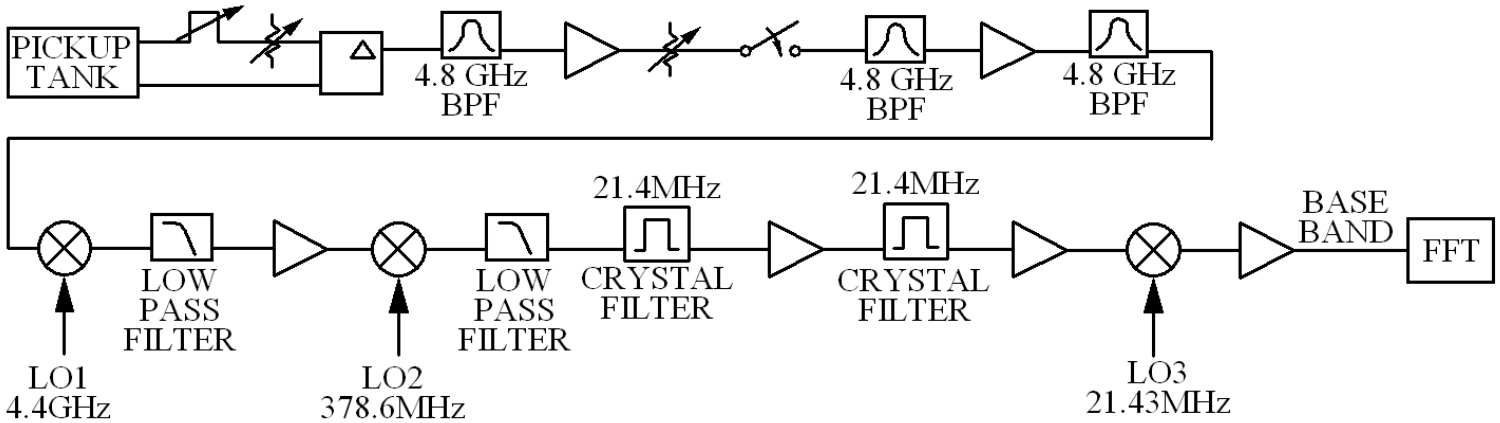


Pickup tanks installed
at LHC Point 4, Spring 2007



LHC Schottky Triple Heterodyne Block Diagram



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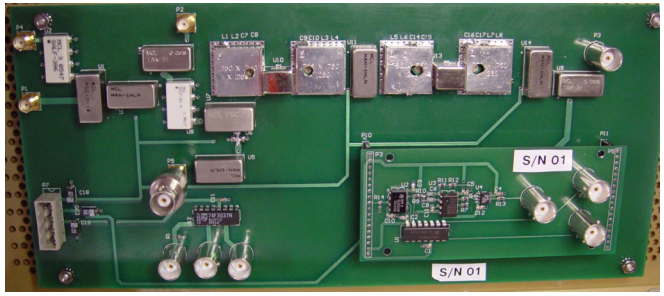
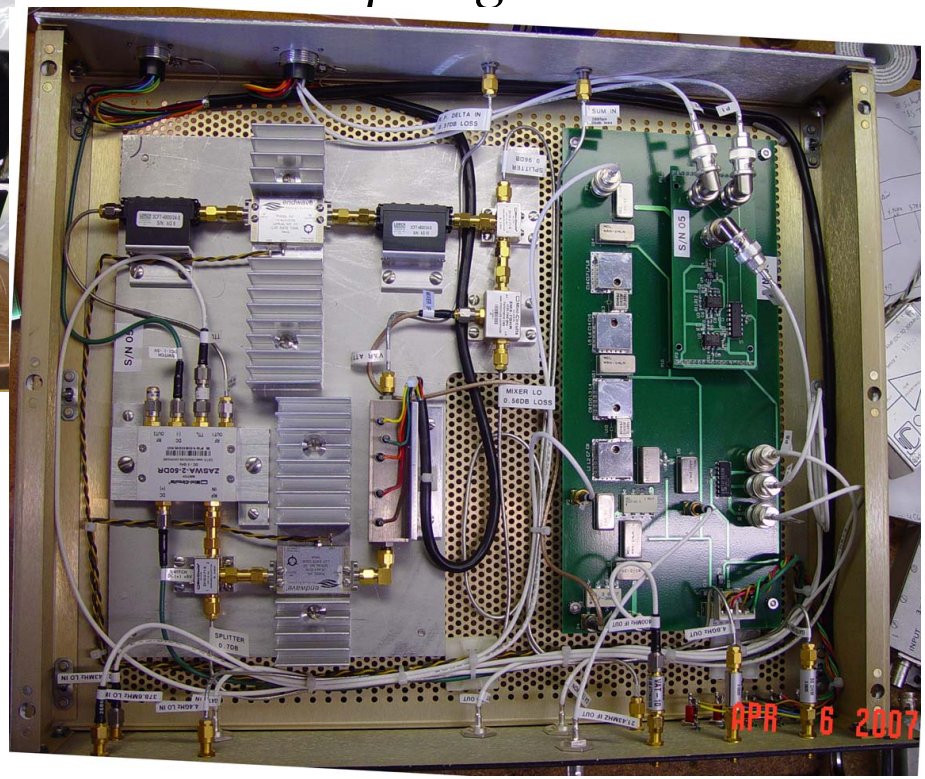
Signal Processing Chassis
Spring 2007





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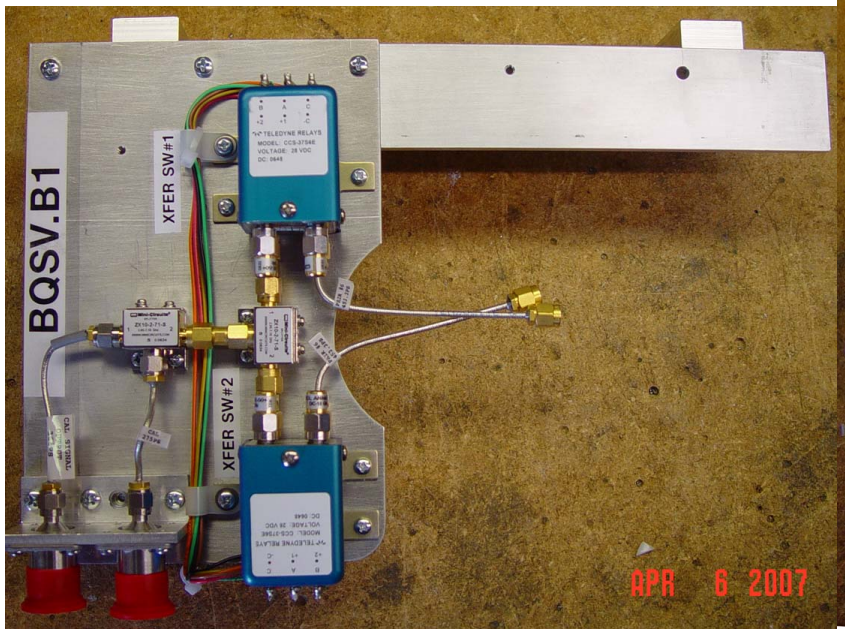
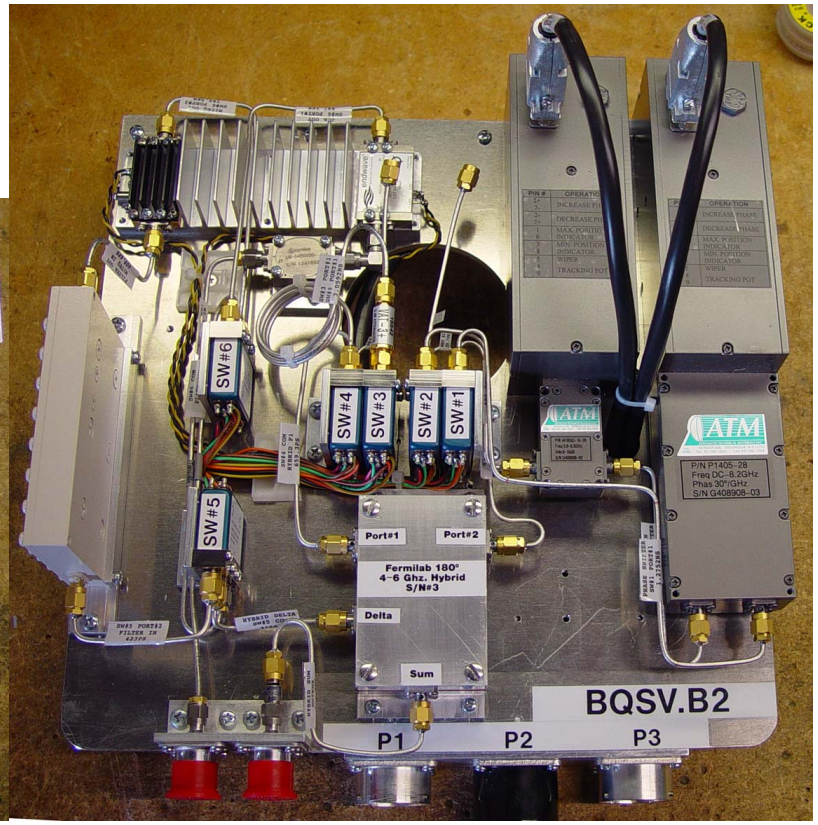
Pickup Plate Hardware





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Crated up and on its way to CERN April 2007!

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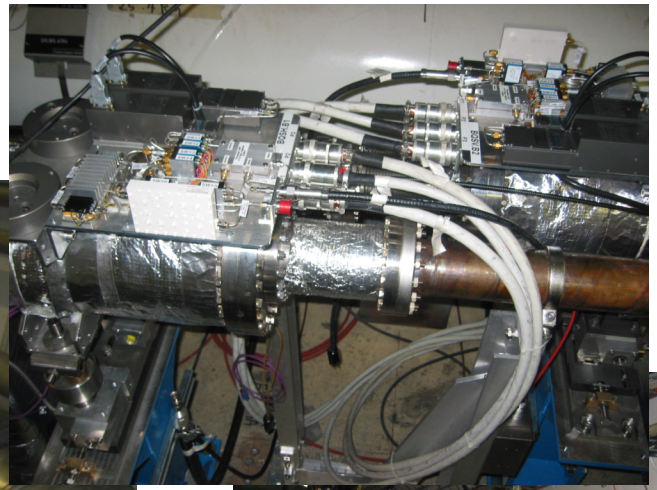
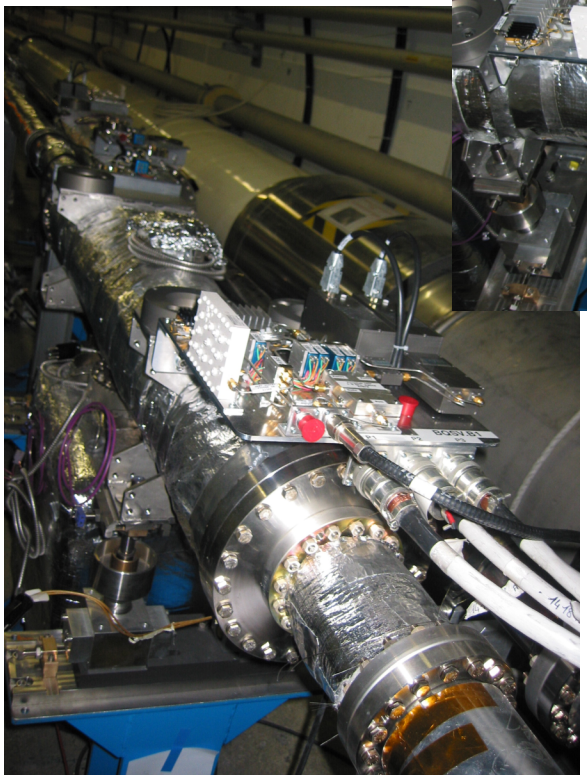
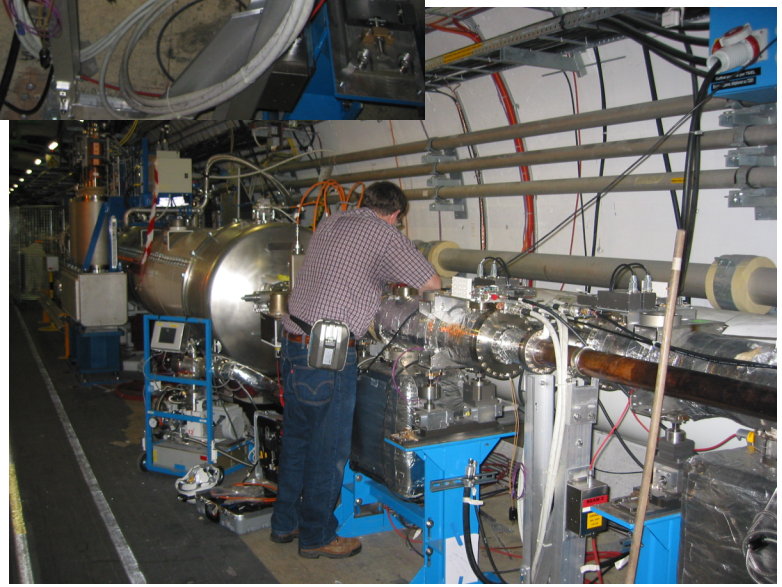
Pickup Hardware Installed May 2007







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Point 4 Alcove Hardware May 2007

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Touring Hardware Installation
May 2007

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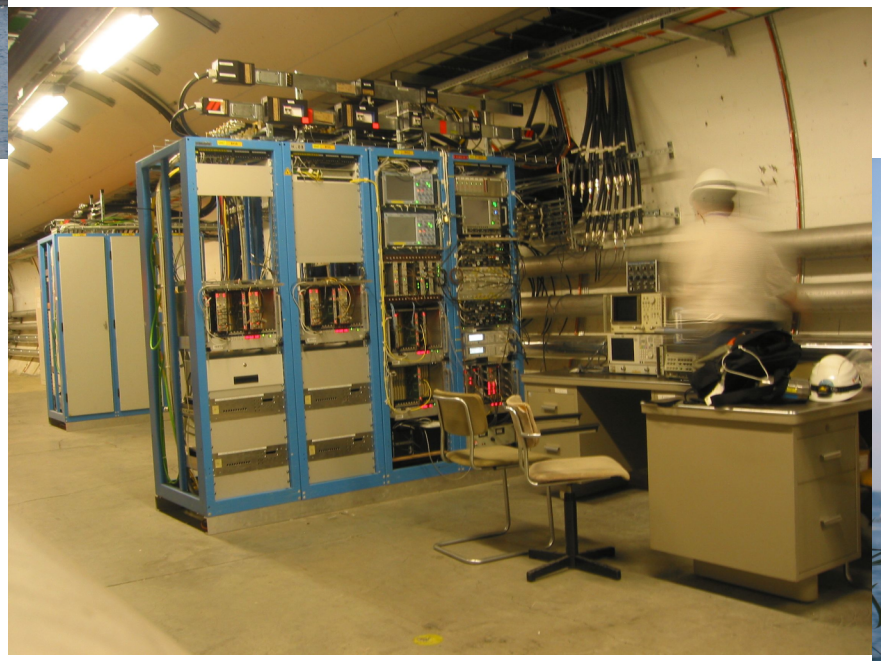
Installation of controls interface



May 2008

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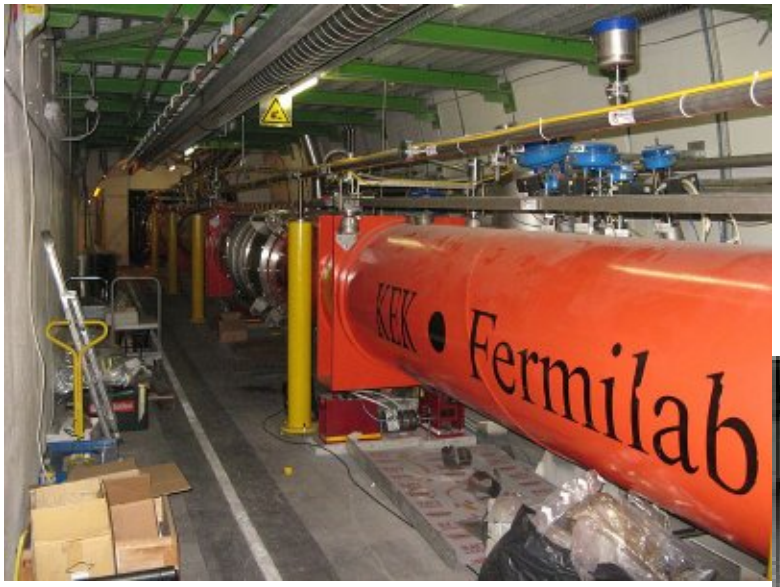

A slight delay in plans…

2008

Two Beam Commissioning Trips to CERN

April 2010
October 2010

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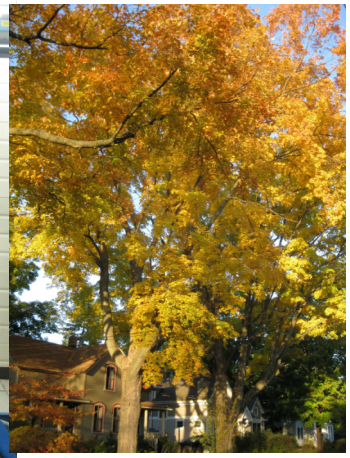

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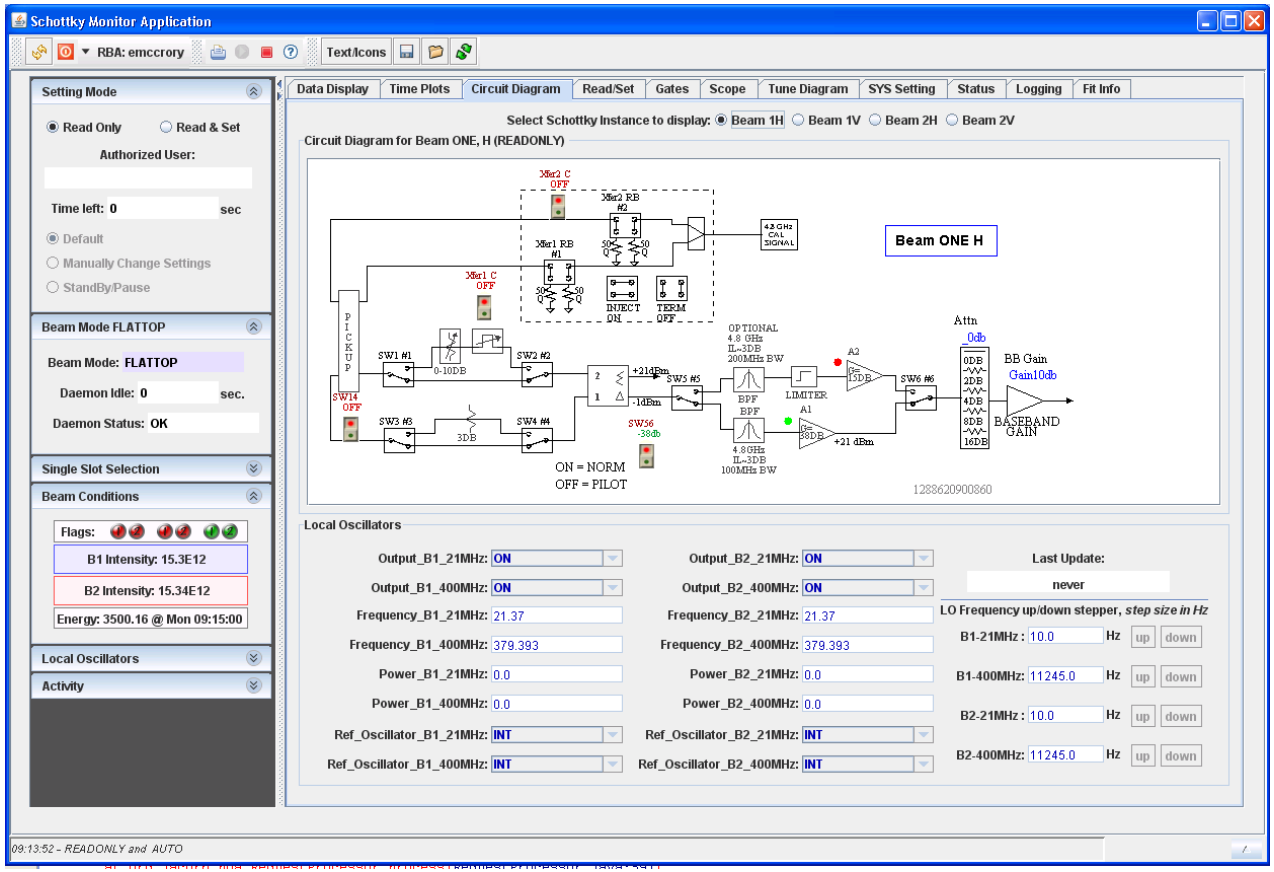
Interactive Graphics Control



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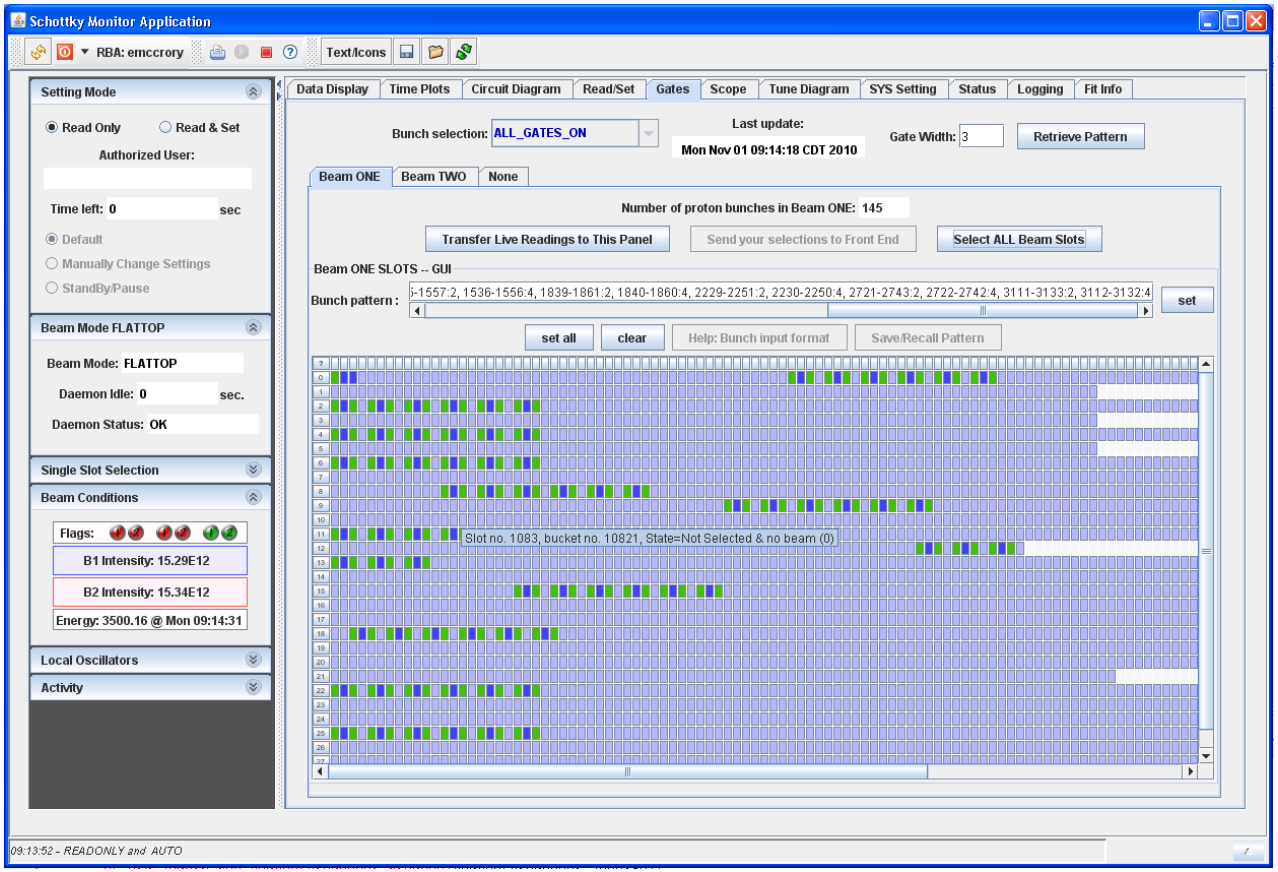
Automated Gating Control



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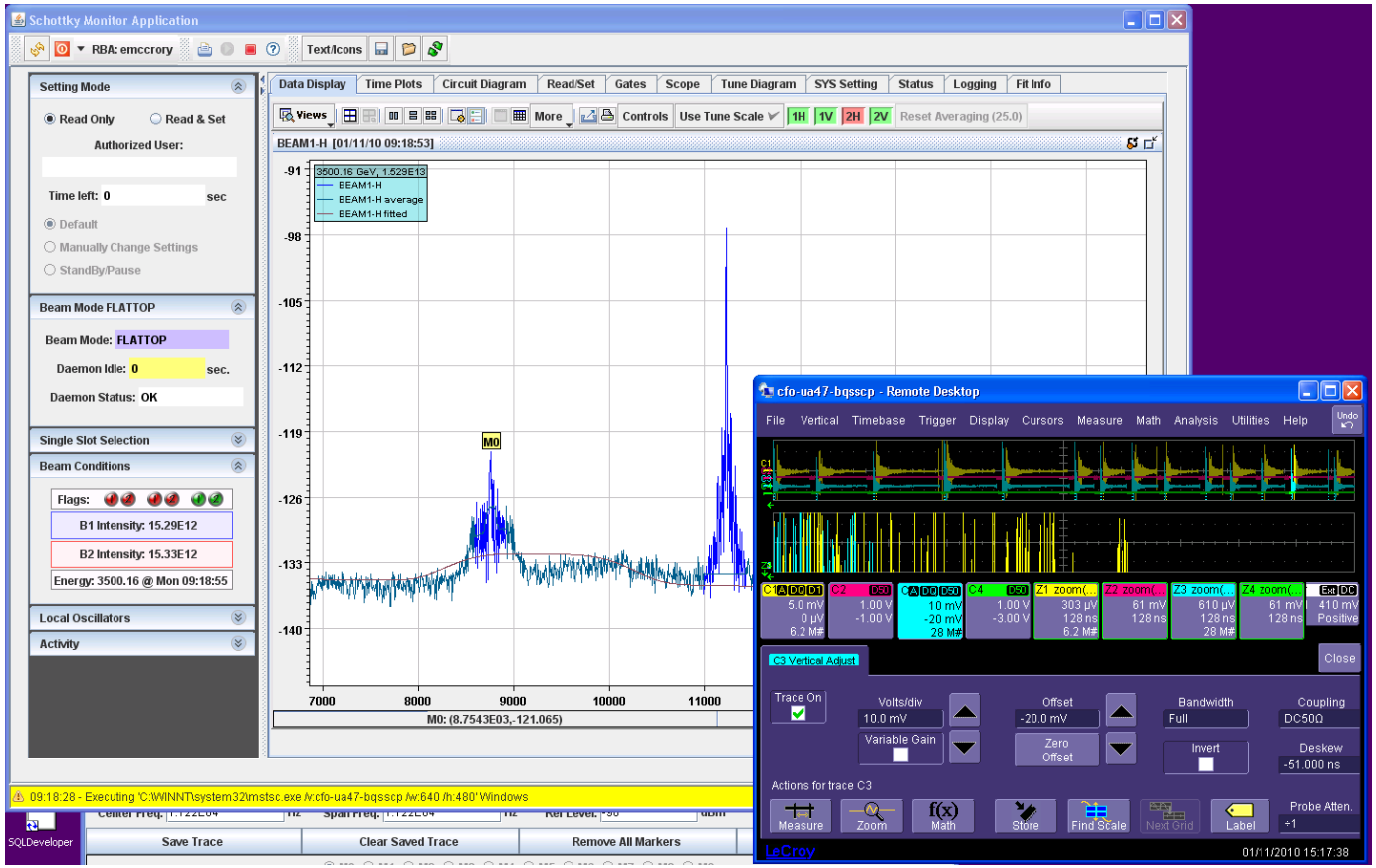
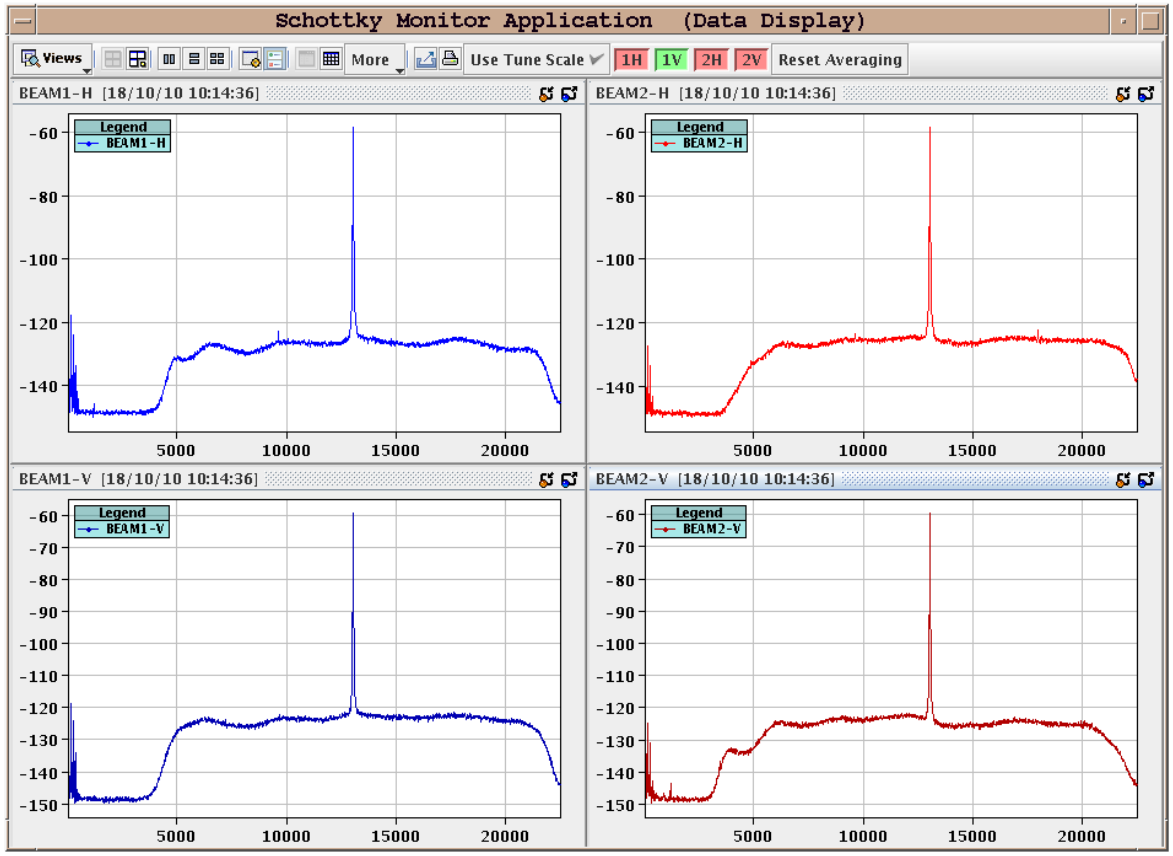
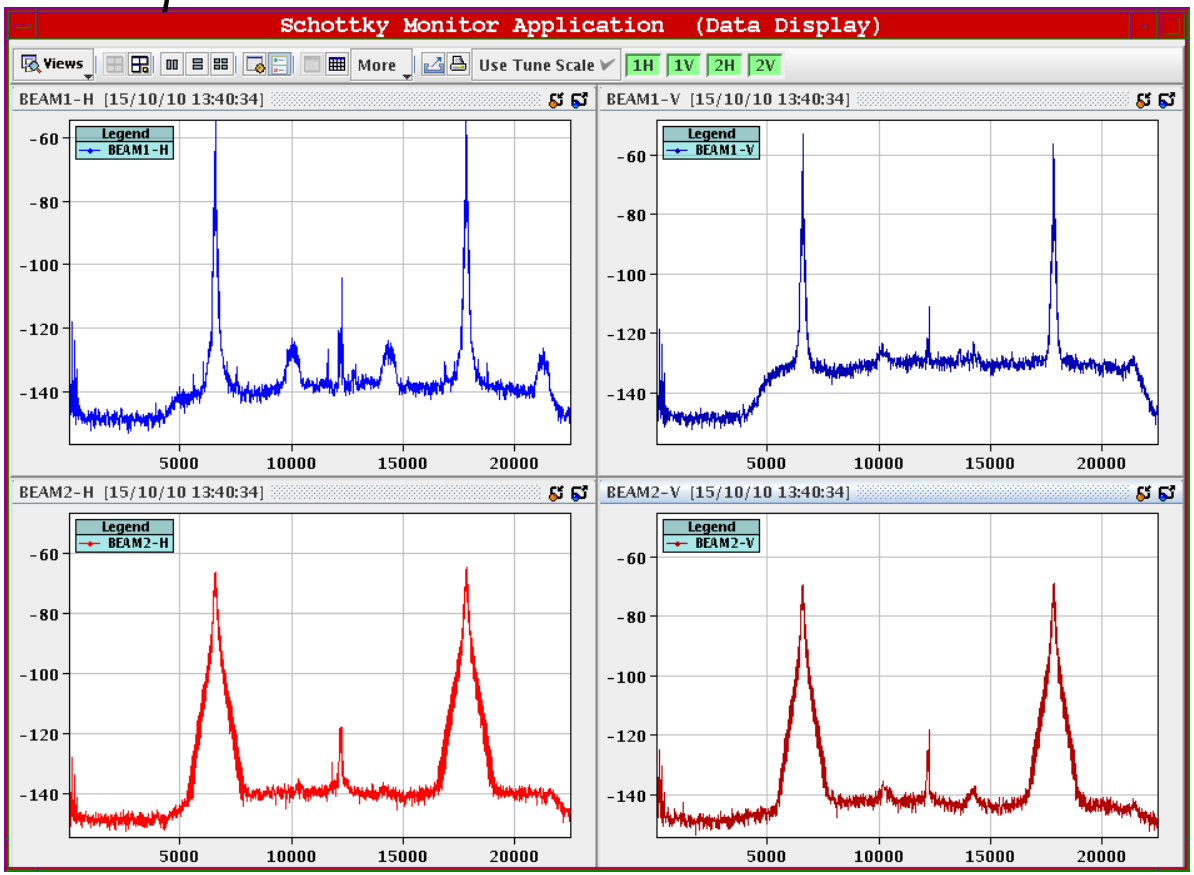
Remote Control of Gate Timing Oscilloscope



Built In Calibration Capability



Spectra Reveal Coherent Phenomena



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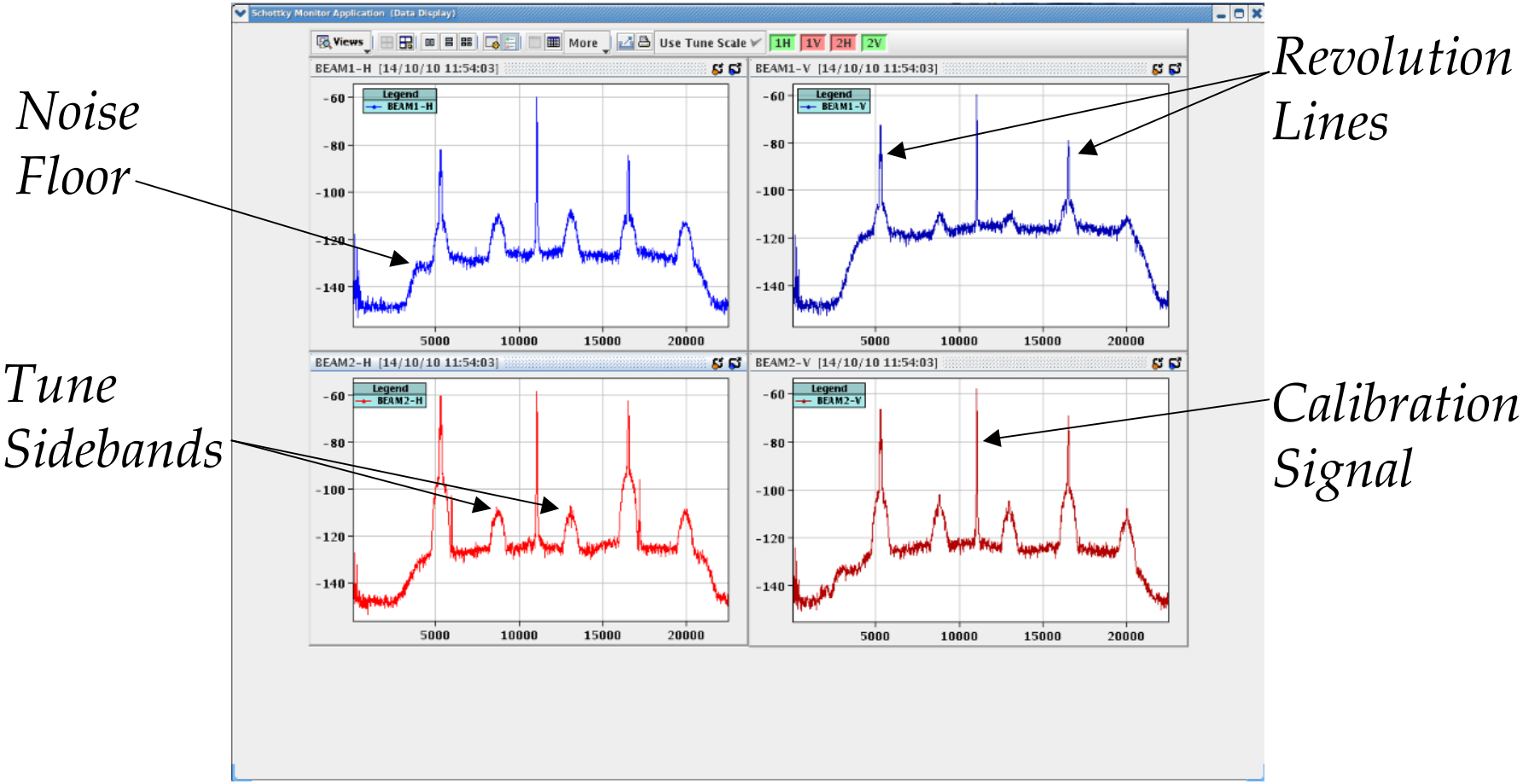
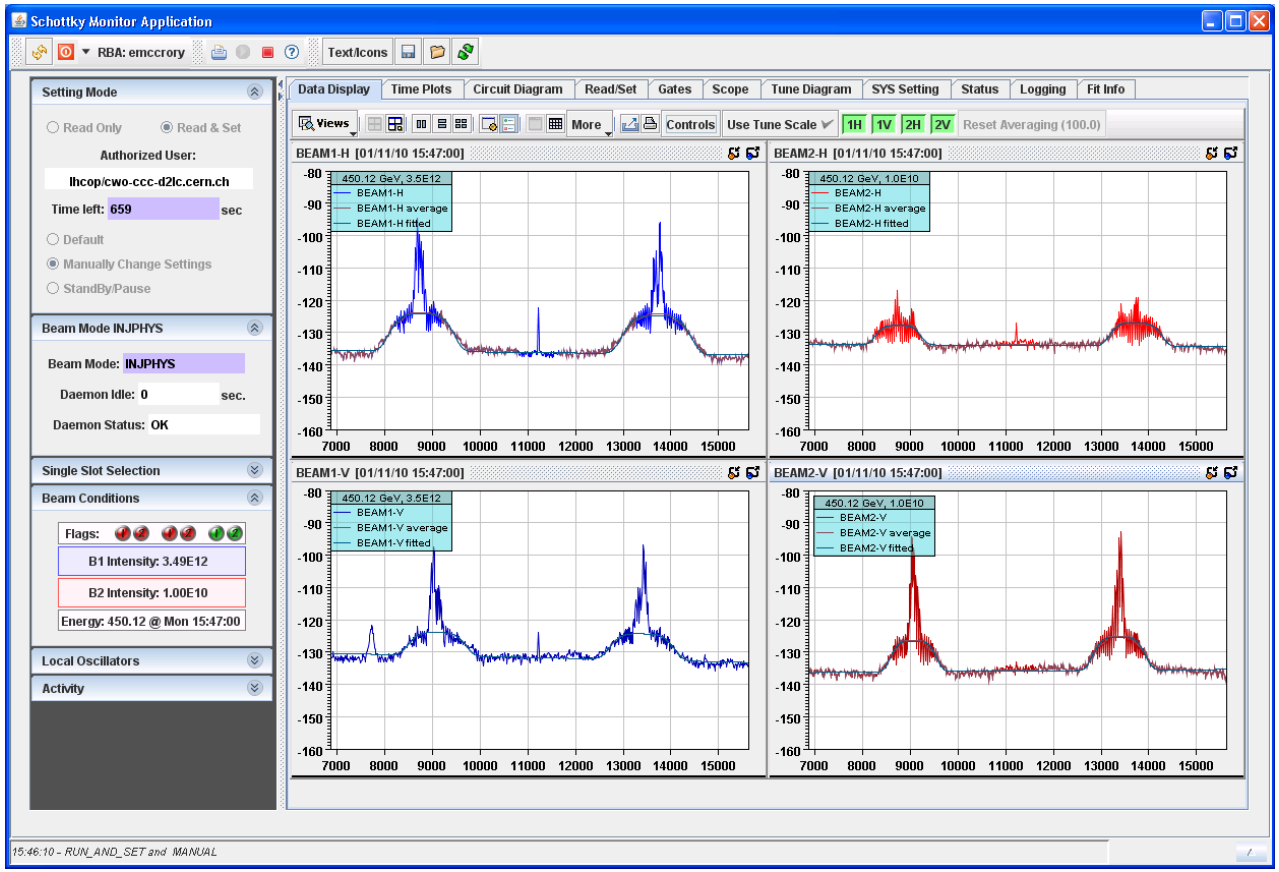
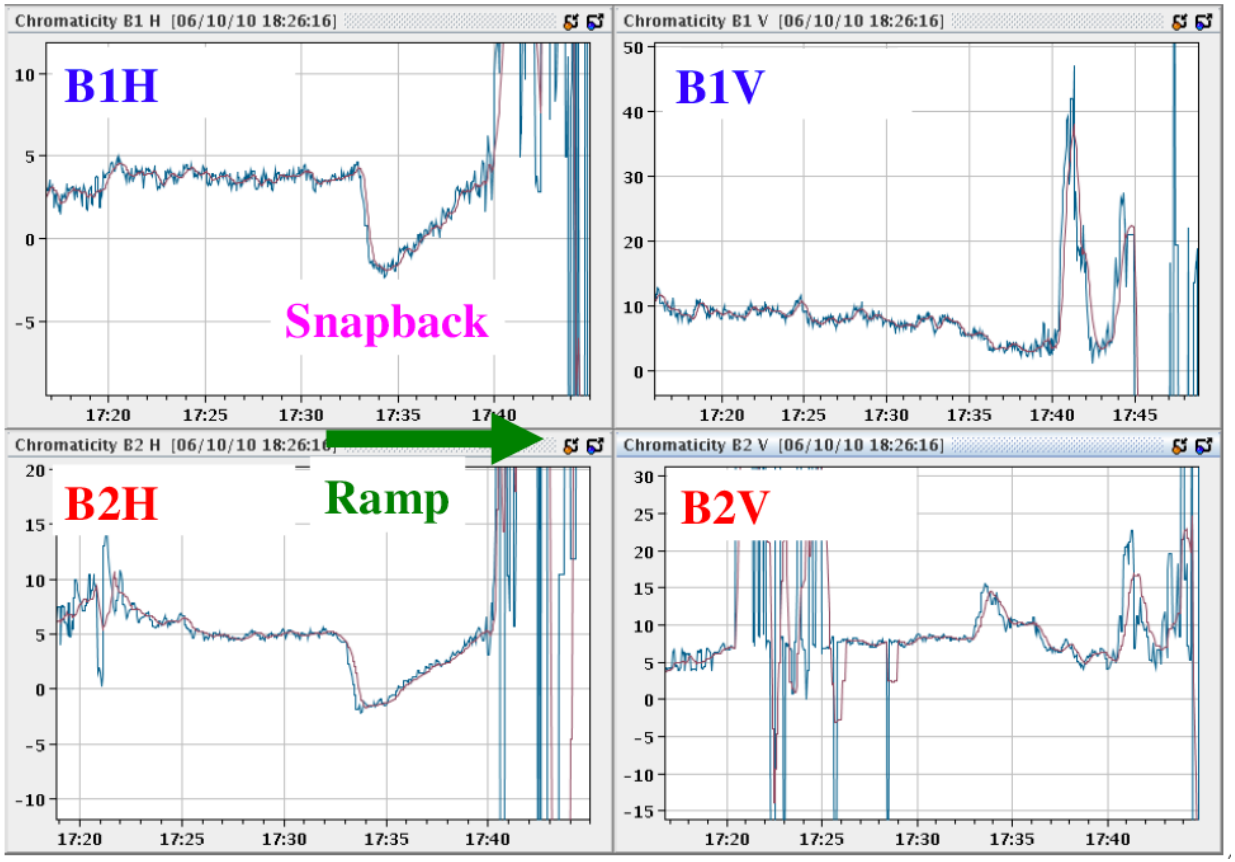


Fit to Tune Sidebands



Chromaticity Measurements



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Data Logged Tunes

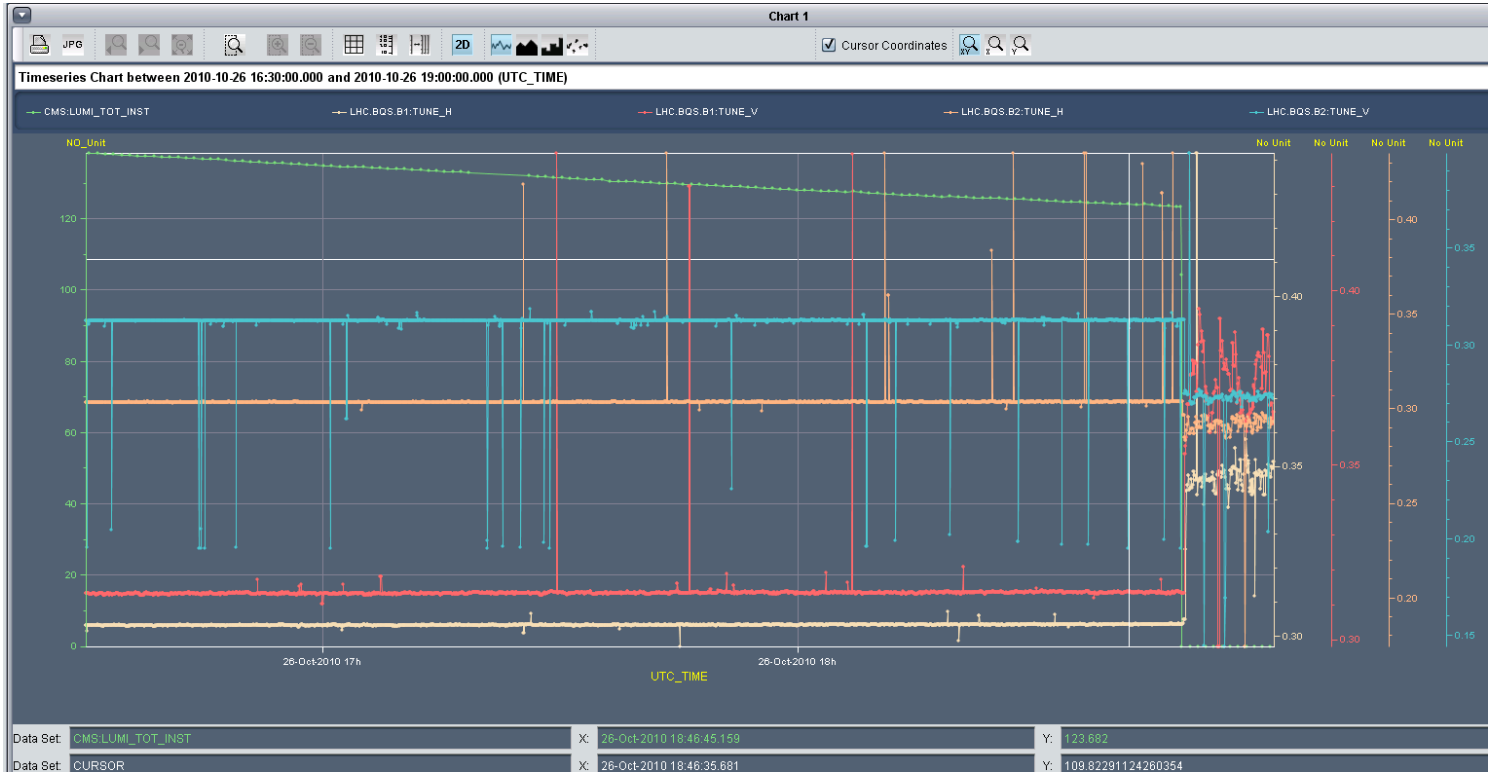
Luminosity

Beam 2V

Beam 2H

Beam 1V

Beam 1H



- ***Capabilities and Commissioning***
  - *Non invasive measurements*
  - *Bunch by bunch transverse measurements*
  - *Measures single bunch with 10^{11} protons/bunch*
  - *Verified tunes track with other tune measurements*
  - *Chromaticities and Momentum spread measured*
  - *Signal tracking for ramped beam measurements*

- ***Things that still need to be done***
  - *Measure pickup response in the tunnel*
  - *Remote control of calibration signal generator*
  - *Implement front end common mode rejection hardware*
  - *Application software becomes operational in the CCC*

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October 2010

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