



# HV Slow Control System for DHCAL RPCs

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**CALICE Technical Board Meeting**

# Purpose

- Slow Control System for the High Voltage Supply of cubic meter DHCAL with RPCs.

(40 Layers with 3 subsections = 120 HV Channels)

## Immediate Implementation

- Cosmic ray, noise and environmental studies performed at ANL.

(~15 Channels and increasing as new large RPCs are built and need to be tested)

# Hardware



Slow Control Computer

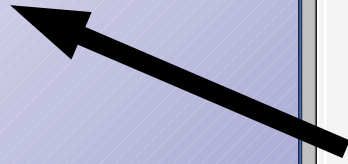
LeCroy 2132  
HV to CAMAC Interface

Wiener CC-USB  
CAMAC Crate Controller

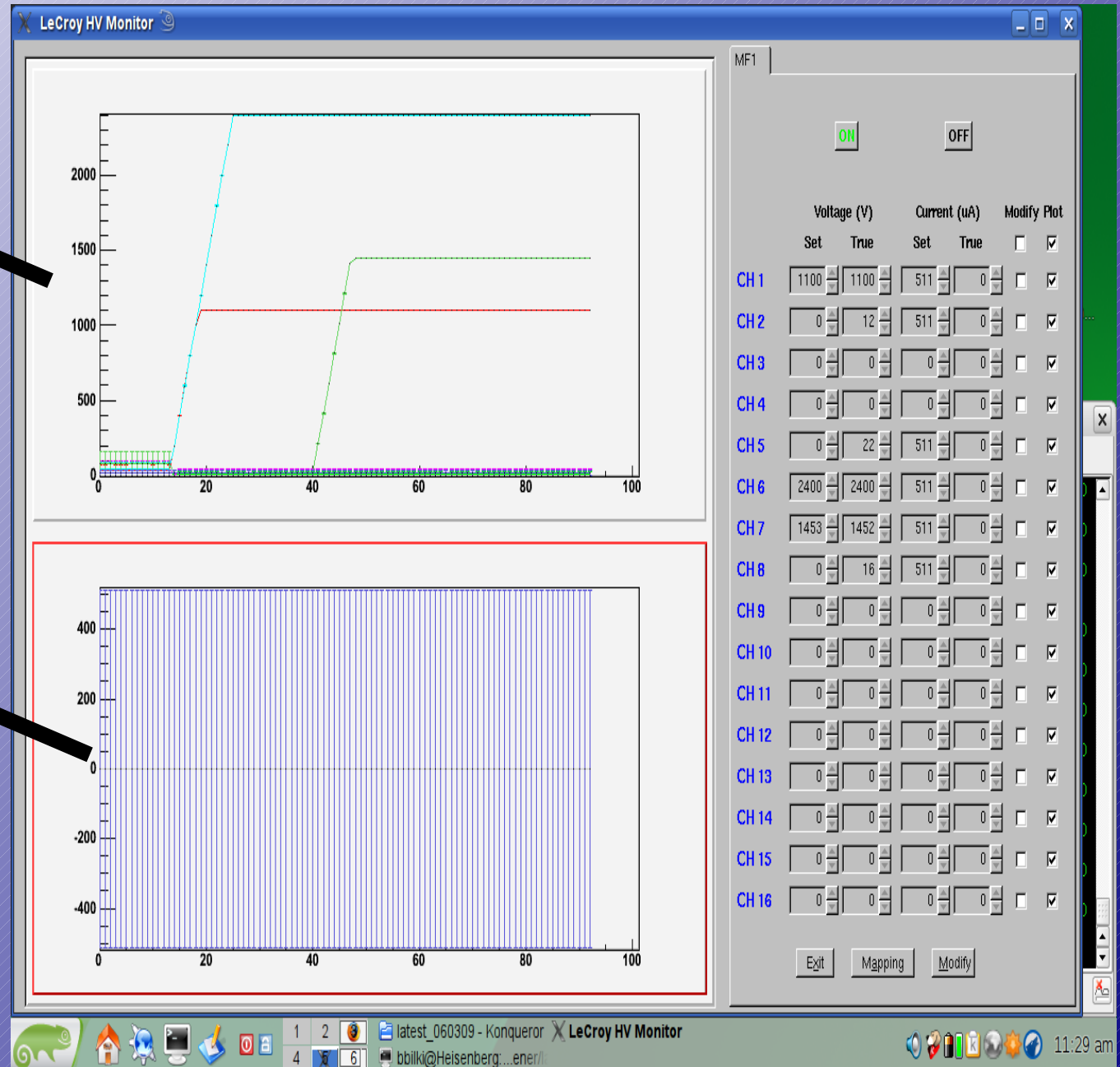
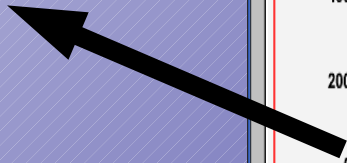
LeCroy 4032A HV Supply  
(with 7kV Pods and  
16 Channels/Mainframe)

# Software

High Voltage Monitor

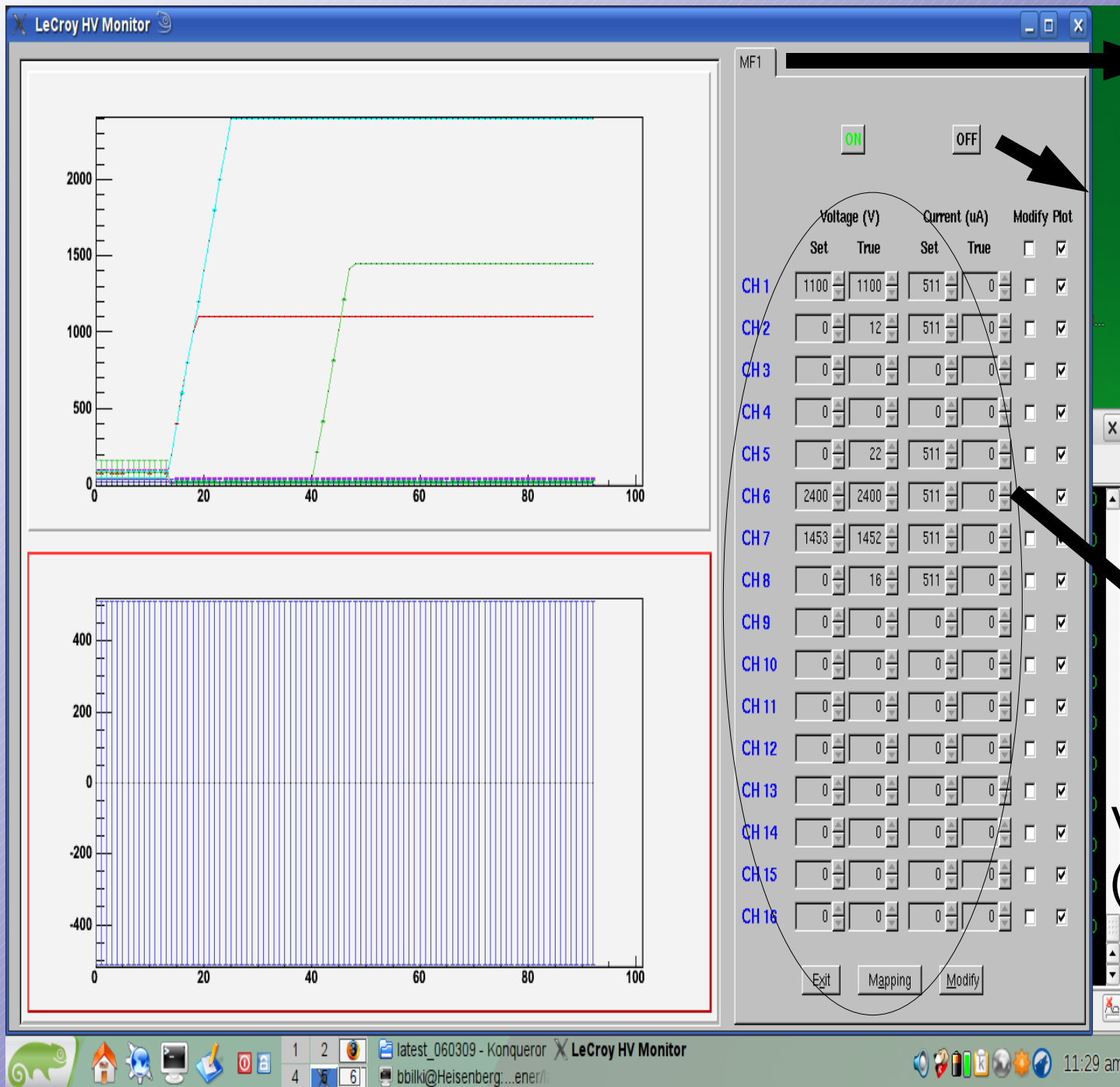


Current Monitor





# Software

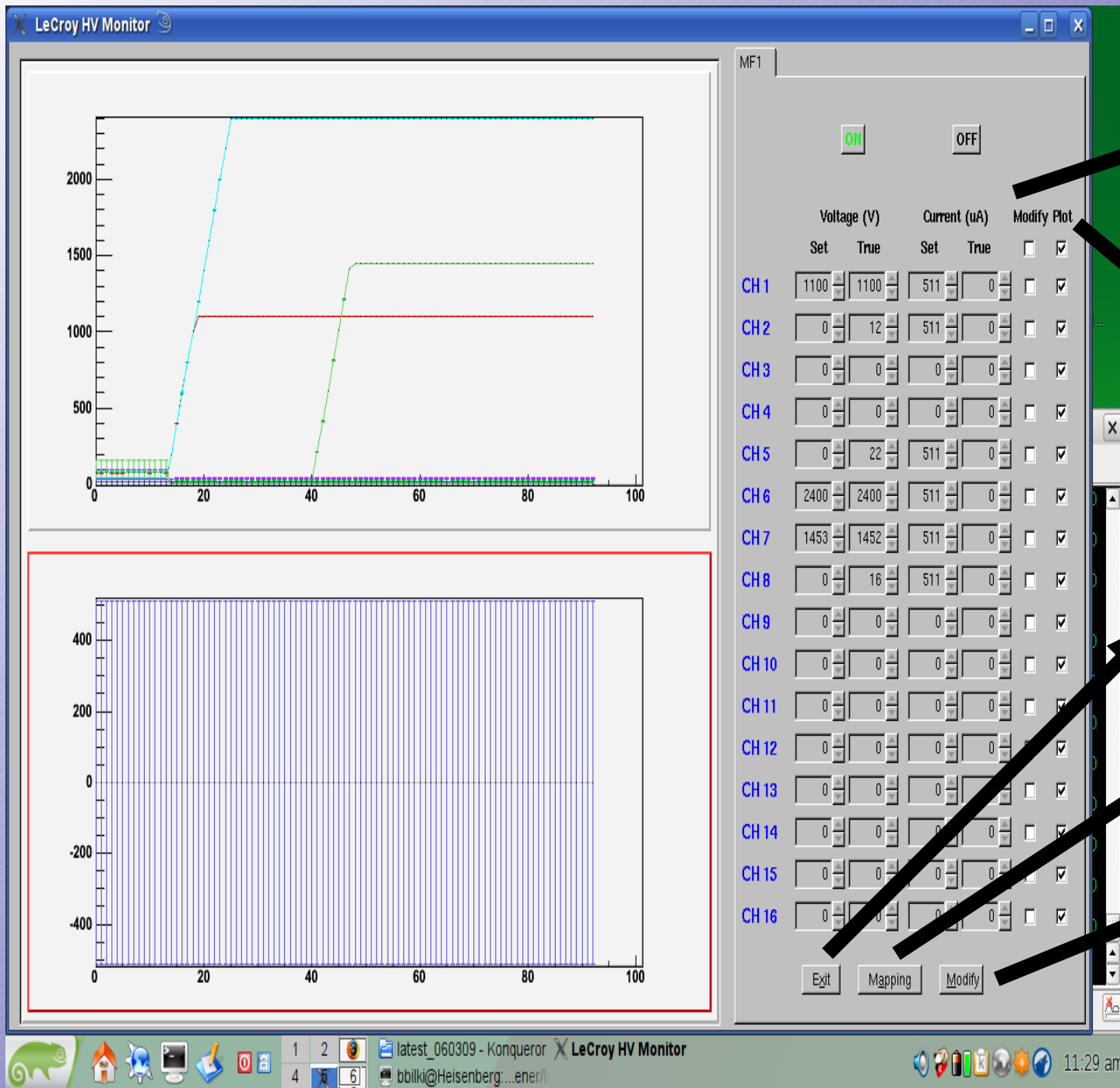


1 Tab for each MF

HV ON/OFF Switches

Set and Real Values for Voltages and Currents (with ALERT indicator)

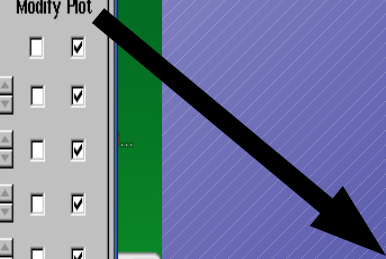
# Software



Modify Voltage Selector



Channel Plot Selector



Exit Button



Channel Mapping



Modify Button



# Backend Functionality

- Readout is recorded to RPCHV MySQL database if:
  - A predefined number of readouts have been performed,
  - One or more channels are modified,
  - An ALERT situation occurs.
- Previous states can then be queried using a PHP-MySQL interface.
- Offline data integration possible.

# Backend Functionality

RPCHV Monitor - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://heisenberg.physics.uiowa.edu/RPCHV/default.php

## DHCAL RPC High Voltage Unit Monitoring

Current Date: 06 15 2009  
Current Time: 11:55 pm

MF1	MF2	MF3	MF4
Select All <input type="checkbox"/>	Select All <input type="checkbox"/>	Select All <input type="checkbox"/>	Select All <input type="checkbox"/>
CH1 <input checked="" type="checkbox"/>	CH1 <input type="checkbox"/>	CH1 <input type="checkbox"/>	CH1 <input type="checkbox"/>
CH2 <input type="checkbox"/>	CH2 <input type="checkbox"/>	CH2 <input type="checkbox"/>	CH2 <input type="checkbox"/>
CH3 <input type="checkbox"/>	CH3 <input type="checkbox"/>	CH3 <input type="checkbox"/>	CH3 <input type="checkbox"/>
CH4 <input type="checkbox"/>	CH4 <input type="checkbox"/>	CH4 <input type="checkbox"/>	CH4 <input type="checkbox"/>
CH5 <input checked="" type="checkbox"/>	CH5 <input type="checkbox"/>	CH5 <input type="checkbox"/>	CH5 <input type="checkbox"/>
CH6 <input checked="" type="checkbox"/>	CH6 <input type="checkbox"/>	CH6 <input type="checkbox"/>	CH6 <input type="checkbox"/>
CH7 <input type="checkbox"/>	CH7 <input type="checkbox"/>	CH7 <input type="checkbox"/>	CH7 <input type="checkbox"/>
CH8 <input checked="" type="checkbox"/>	CH8 <input type="checkbox"/>	CH8 <input type="checkbox"/>	CH8 <input type="checkbox"/>
CH9 <input type="checkbox"/>	CH9 <input type="checkbox"/>	CH9 <input type="checkbox"/>	CH9 <input type="checkbox"/>
CH10 <input type="checkbox"/>	CH10 <input type="checkbox"/>	CH10 <input type="checkbox"/>	CH10 <input type="checkbox"/>
CH11 <input type="checkbox"/>	CH11 <input type="checkbox"/>	CH11 <input type="checkbox"/>	CH11 <input type="checkbox"/>
CH12 <input checked="" type="checkbox"/>	CH12 <input type="checkbox"/>	CH12 <input type="checkbox"/>	CH12 <input type="checkbox"/>
CH13 <input type="checkbox"/>	CH13 <input type="checkbox"/>	CH13 <input type="checkbox"/>	CH13 <input type="checkbox"/>
CH14 <input type="checkbox"/>	CH14 <input type="checkbox"/>	CH14 <input type="checkbox"/>	CH14 <input type="checkbox"/>
CH15 <input type="checkbox"/>	CH15 <input type="checkbox"/>	CH15 <input type="checkbox"/>	CH15 <input type="checkbox"/>
CH16 <input type="checkbox"/>	CH16 <input type="checkbox"/>	CH16 <input type="checkbox"/>	CH16 <input type="checkbox"/>

beagle is indexing http://heisenberg.physics.uiowa.edu/RPCHV/default.php

RPCHV Monitor - Mozilla

11:55 pm



# Backend Functionality

RPCHV Monitor - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://heisenberg.physics.uiowa.edu/RPCHV/default.php

MF5	MF6	MF7	MF8
Select All <input type="checkbox"/>	Select All <input type="checkbox"/>	Select All <input type="checkbox"/>	Select All <input type="checkbox"/>
CH1 <input type="checkbox"/>	CH1 <input type="checkbox"/>	CH1 <input type="checkbox"/>	CH1 <input type="checkbox"/>
CH2 <input type="checkbox"/>	CH2 <input type="checkbox"/>	CH2 <input type="checkbox"/>	CH2 <input type="checkbox"/>
CH3 <input type="checkbox"/>	CH3 <input type="checkbox"/>	CH3 <input type="checkbox"/>	CH3 <input type="checkbox"/>
CH4 <input type="checkbox"/>	CH4 <input type="checkbox"/>	CH4 <input type="checkbox"/>	CH4 <input type="checkbox"/>
CH5 <input type="checkbox"/>	CH5 <input type="checkbox"/>	CH5 <input type="checkbox"/>	CH5 <input type="checkbox"/>
CH6 <input type="checkbox"/>	CH6 <input type="checkbox"/>	CH6 <input type="checkbox"/>	CH6 <input type="checkbox"/>
CH7 <input type="checkbox"/>	CH7 <input type="checkbox"/>	CH7 <input type="checkbox"/>	CH7 <input type="checkbox"/>
CH8 <input type="checkbox"/>	CH8 <input type="checkbox"/>	CH8 <input type="checkbox"/>	CH8 <input type="checkbox"/>
CH9 <input type="checkbox"/>	CH9 <input type="checkbox"/>	CH9 <input type="checkbox"/>	CH9 <input type="checkbox"/>
CH10 <input type="checkbox"/>	CH10 <input type="checkbox"/>	CH10 <input type="checkbox"/>	CH10 <input type="checkbox"/>
CH11 <input type="checkbox"/>	CH11 <input type="checkbox"/>	CH11 <input type="checkbox"/>	CH11 <input type="checkbox"/>
CH12 <input type="checkbox"/>	CH12 <input type="checkbox"/>	CH12 <input type="checkbox"/>	CH12 <input type="checkbox"/>
CH13 <input type="checkbox"/>	CH13 <input type="checkbox"/>	CH13 <input type="checkbox"/>	CH13 <input type="checkbox"/>
CH14 <input type="checkbox"/>	CH14 <input type="checkbox"/>	CH14 <input type="checkbox"/>	CH14 <input type="checkbox"/>
CH15 <input type="checkbox"/>	CH15 <input type="checkbox"/>	CH15 <input type="checkbox"/>	CH15 <input type="checkbox"/>
CH16 <input type="checkbox"/>	CH16 <input type="checkbox"/>	CH16 <input type="checkbox"/>	CH16 <input type="checkbox"/>

Start Date (YYYY-MM-DD):  End Date (YYYY-MM-DD):

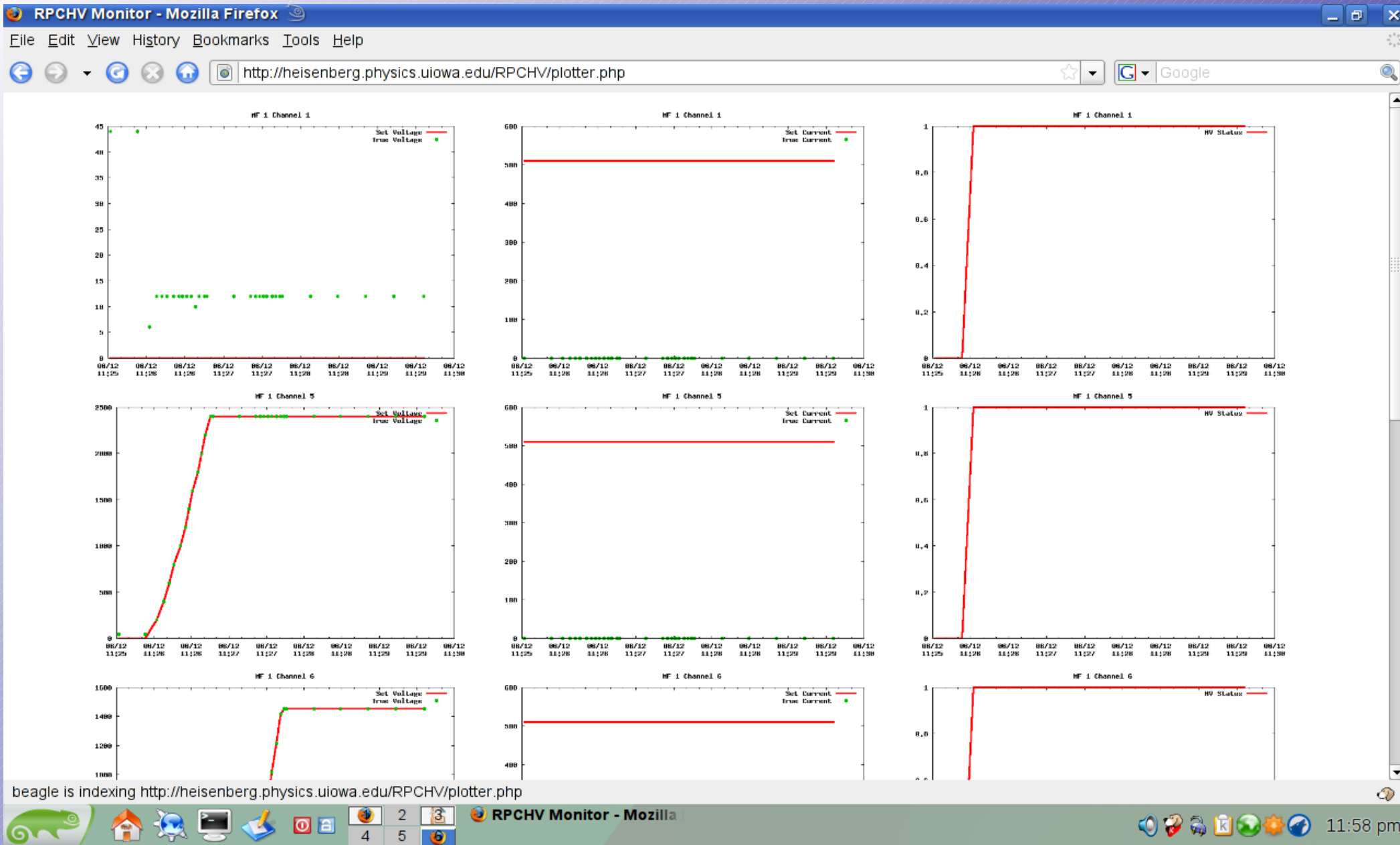
Time (HH:MM):  Time (HH:MM):

beagle is indexing http://heisenberg.physics.uiowa.edu/RPCHV/plotter.php

RPCHV Monitor - Mozilla

11:57 pm

# Backend Functionality



beagle is indexing <http://heisenberg.physics.uiowa.edu/RPCHV/plotter.php>

RPCHV Monitor - Mozilla

11:58 pm

# Current Progress

- System tested with two HV Mainframes in Iowa  
-----> Works Well!!!
- Installed the system for use at ANL.  
-----> Worked Well in first 3 hours!!!

# Future Progress

- Wait for possible runtime errors.
- Test for long term stability of both hardware and software.
- Check for pod malfunctions, fix as soon as possible and put the Slow Control in operation.
- Obtain the remaining Mainframes, test the large system at Iowa, transfer to ANL.