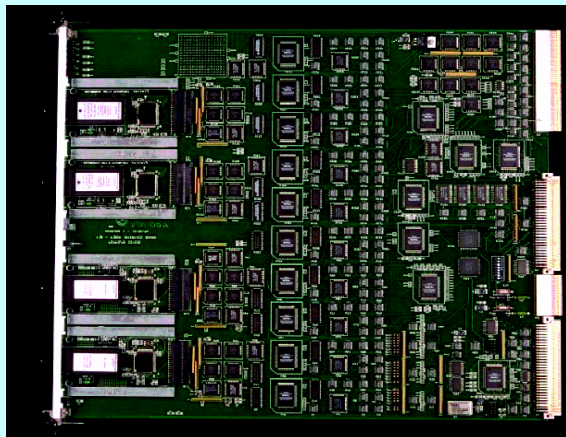


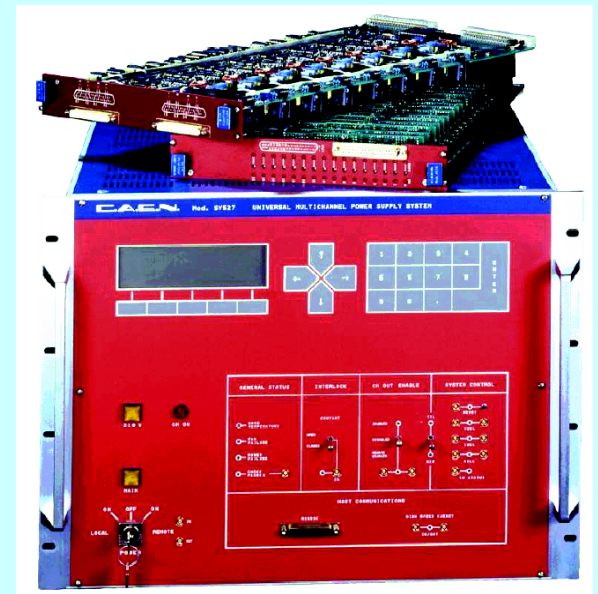
# Hockerizations and SEU's

## 2. Silicon Workshop Santa Babara 05/12/2006

Jeannine Wagner, University of Karlsruhe



- CAEN power supply failures  
power
- FIB sequence RAM corruptions  
fib
- Combination



# CAEN's – Failure modes

**Andy Hocker**



## **1. Loss of communication:**

Crate spontaneously stops communication via CAENnet

## **2. Spontaneous turn off:**

All supplies in the crate are spontaneously turned off

## **3. Garbled readback:**

Values of voltages and currents readback are nonsense

**Fixed by Hockerization:  
Reboot crate**

**Afterwards all ladders  
can be turned on**

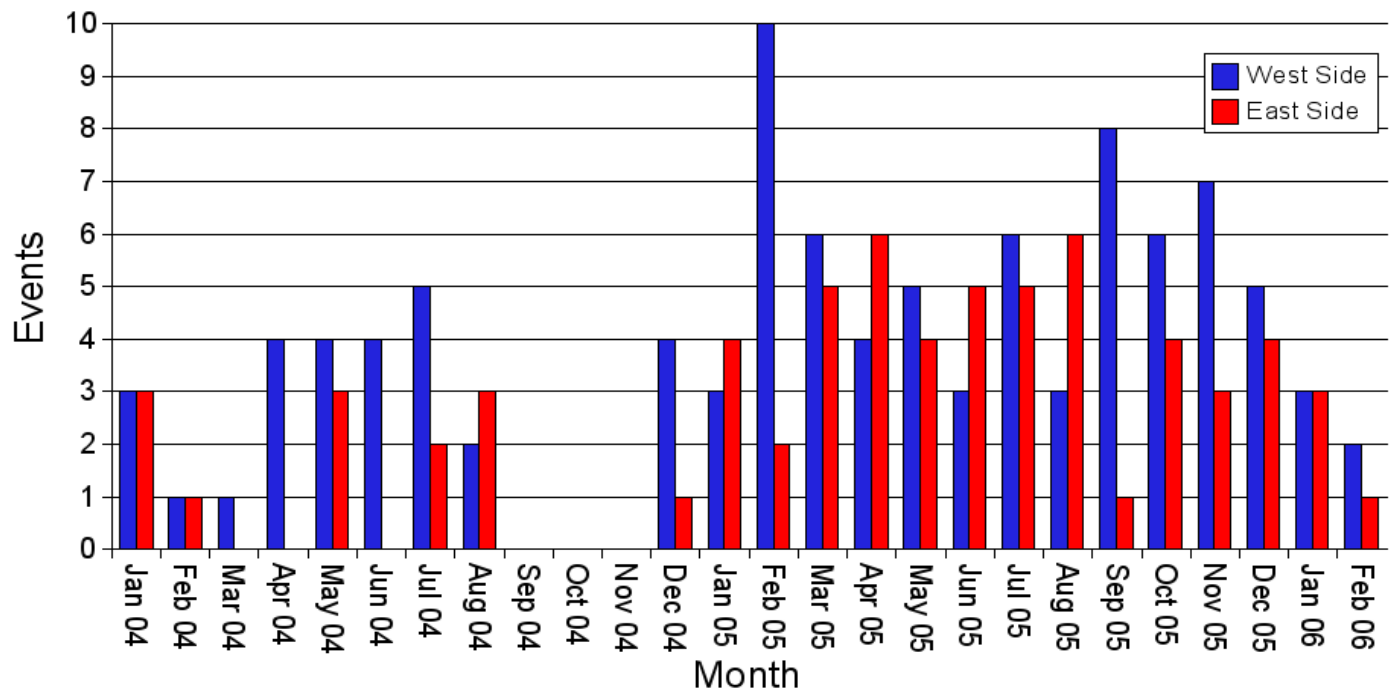
# Rate of CAEN Hockerization

Data: Jan 2004 – Feb 2006

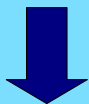
- **Total** : 165 incidents,  $6.3 \pm 3.8$  per month
- **West side**: 99 incidents,  $3.8 \pm 2.5$  per month
- **East side**: 66 incidents,  $2.5 \pm 2.0$  per month

Higher rate on west side probably caused by higher particle flux due to proton losses on west side

### Silicon CAEN Hockerizations

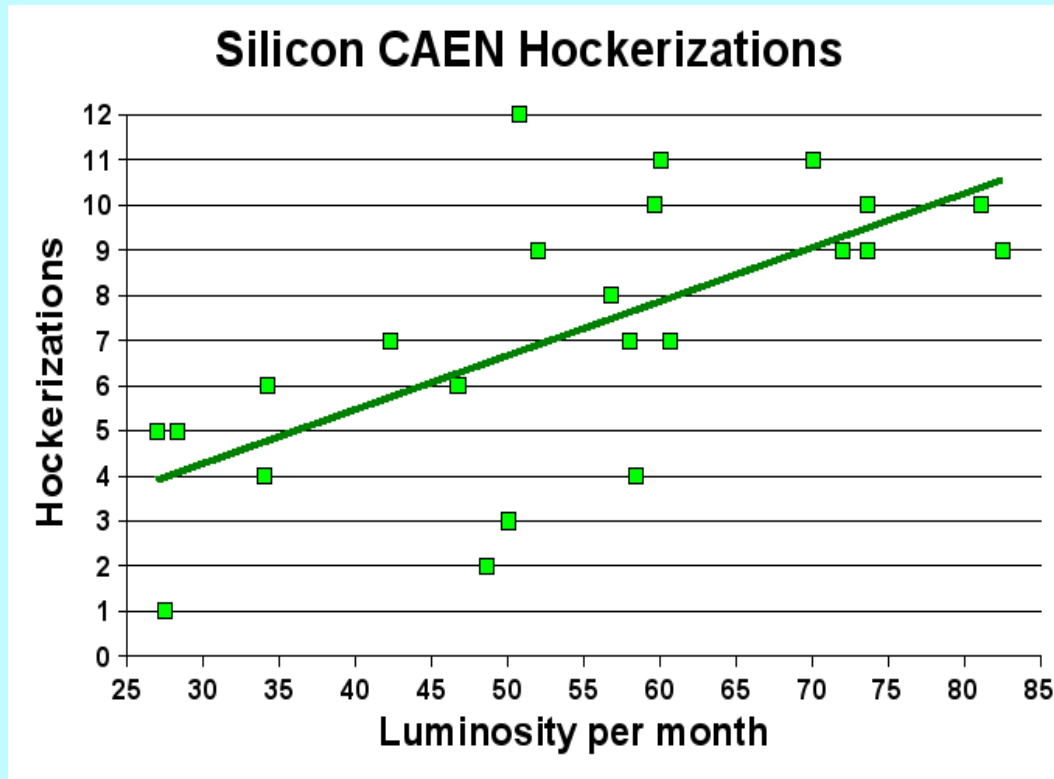


No Hockerizations during shutdown (Sep04-Nov04)



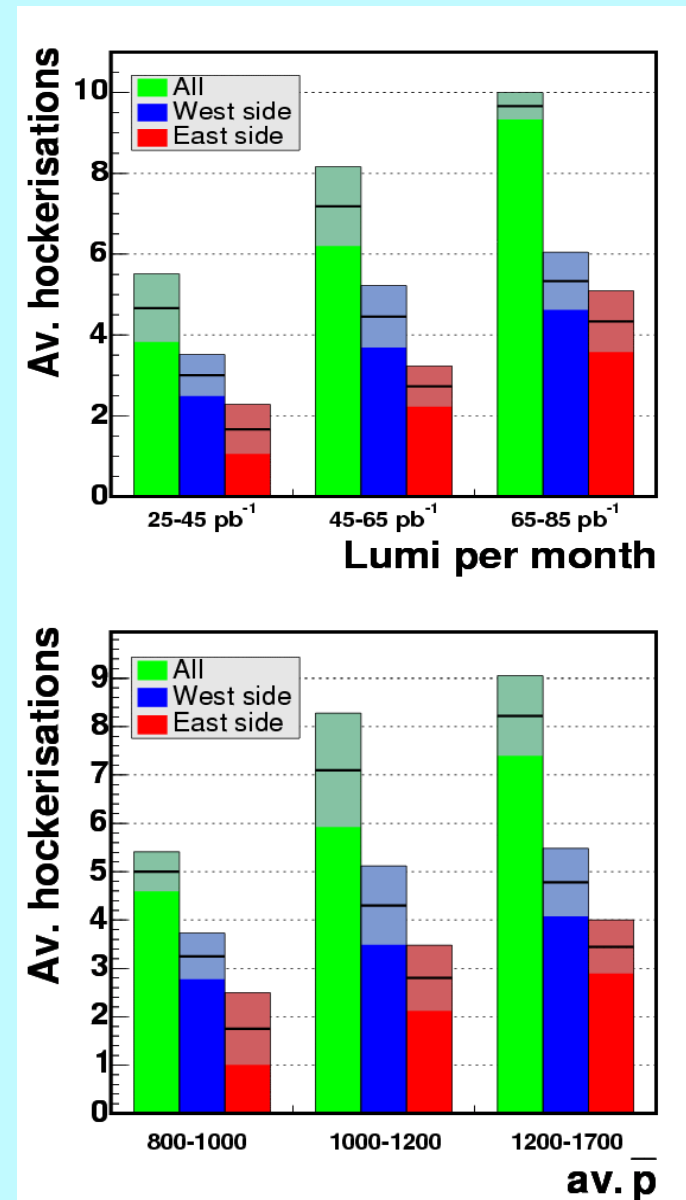
No aging process

# Hockerizations – More Details



**Number of Hockerizations increases with increasing luminosity (cor. coeff. = 0.66)**


- Anti-proton current increased steady (cor. coeff. = 0.33)
- Proton current stays almost the same (cor. coeff = 0)
- Machine improvements



# FIB sequence RAM corruption

## FIB:

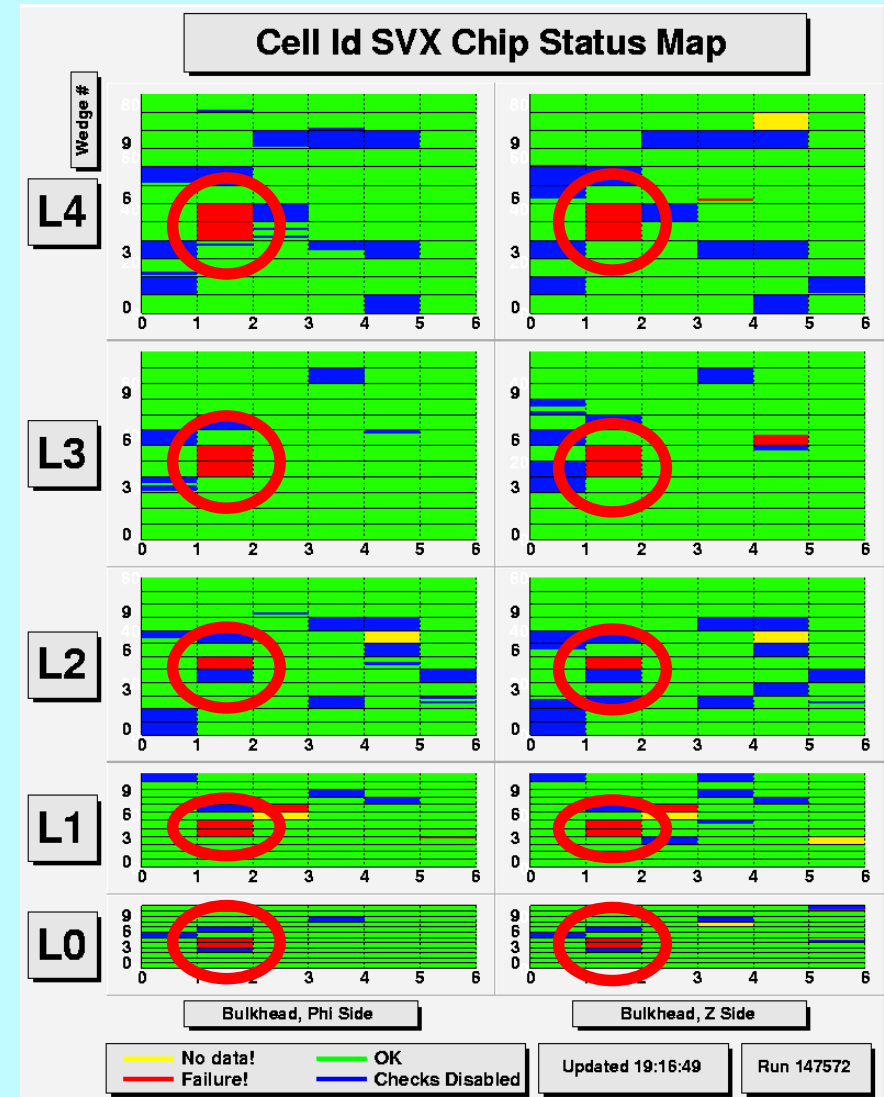
- Interface between DAQ and SVX3D chip
- Receives incoming high level DAQ commands and transforms these in a set of SVX3D commands (sequence)
- Sequences in RAM are checksummed and compared to the once stored in the EEPROM

Different  sequence RAM corruption

## Fix of corruption:

- Reload from EEPROM

## SVXMon – Fib corruption





# Rate of FIB Corruptions

Data: Feb 2005 – Feb 2006

- **Total** : 208 incidents,  $16.0 \pm 7.5$  per month
- **West side**: 103 incidents,  $7.9 \pm 4.3$  per month
- **East side** : 105 incidents,  $8.1 \pm 3.9$  per month

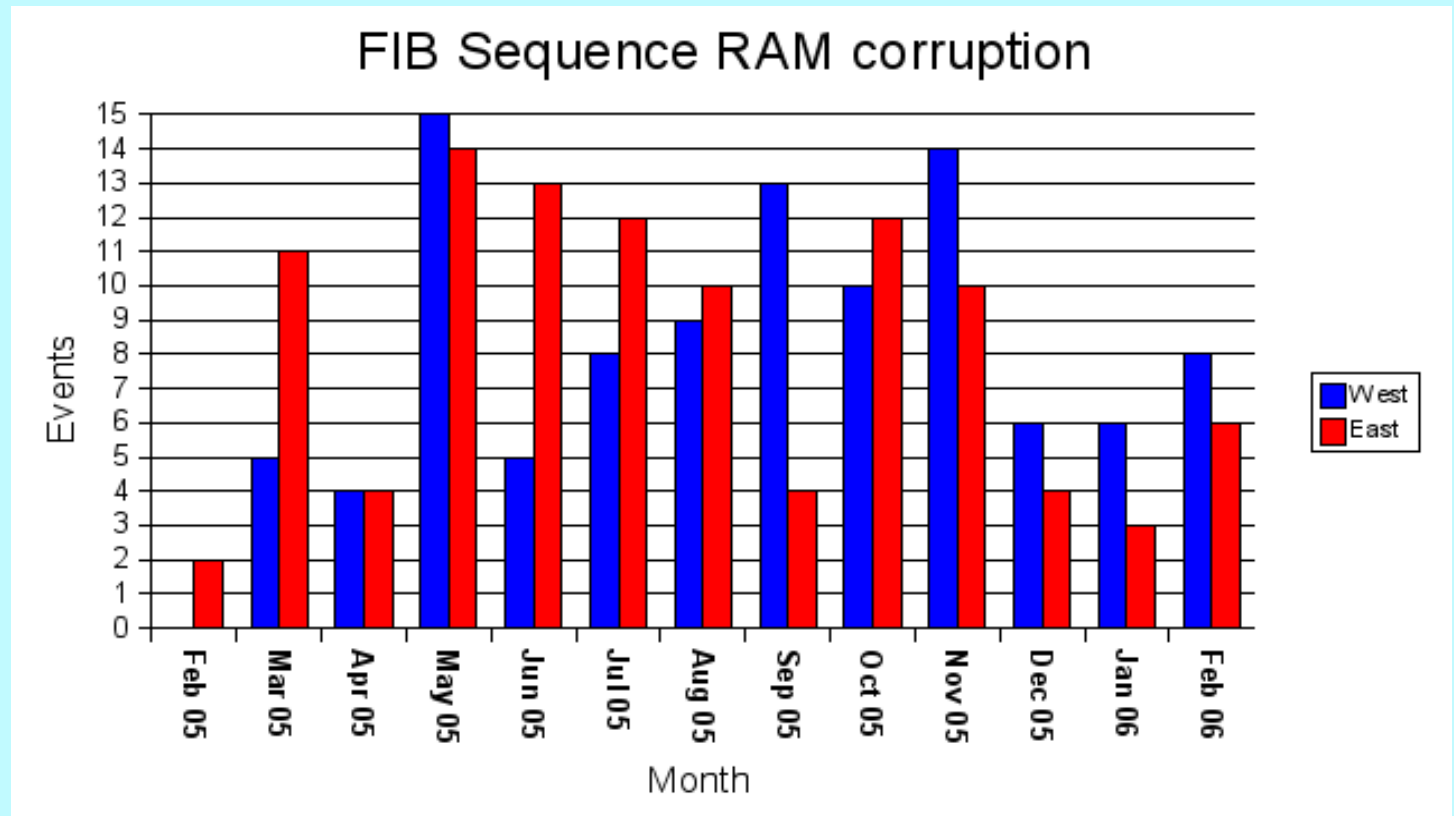
Rates on west and east side are the same

8 Fib crates  
16 CAEN crates

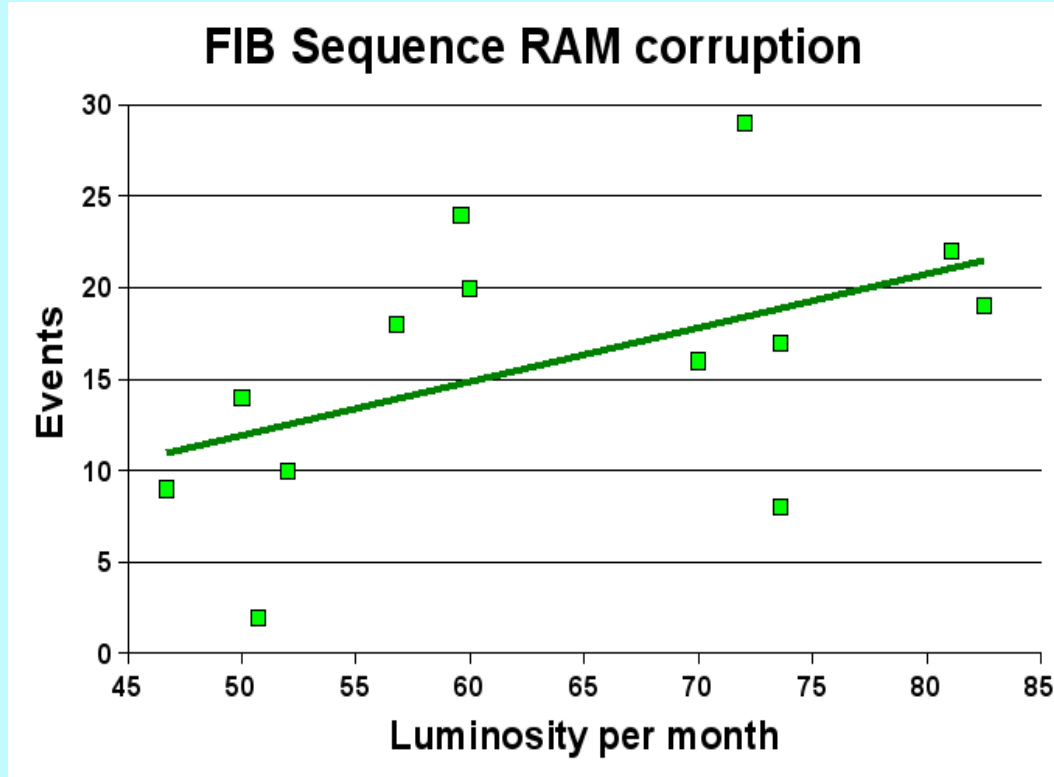
208 FIB incidents  
117 CAEN incidents



Rate (per crate) of FIB incidents is a factor 3.6 higher than that for CAEN's

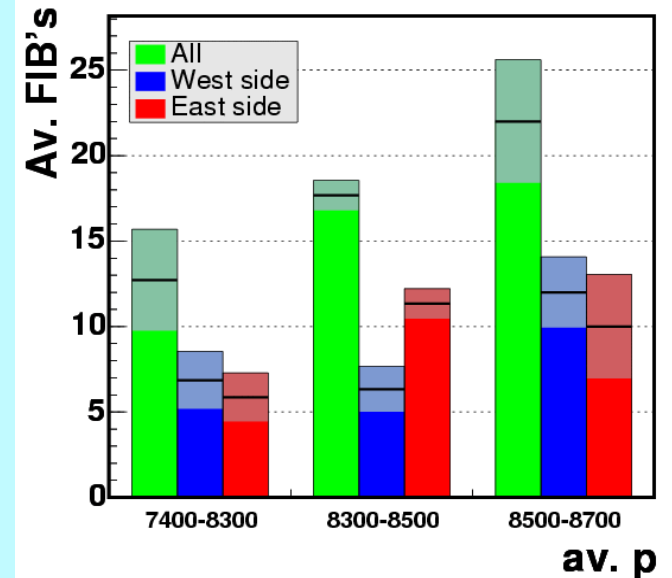
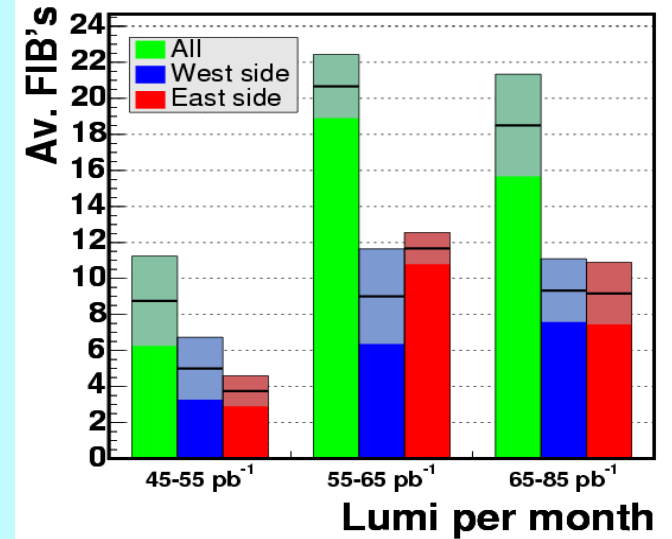


# FIB Corruptions – More Details



**Slight increase of FIB corruptions with increasing luminosity (cor. coeff. = 0.49)**

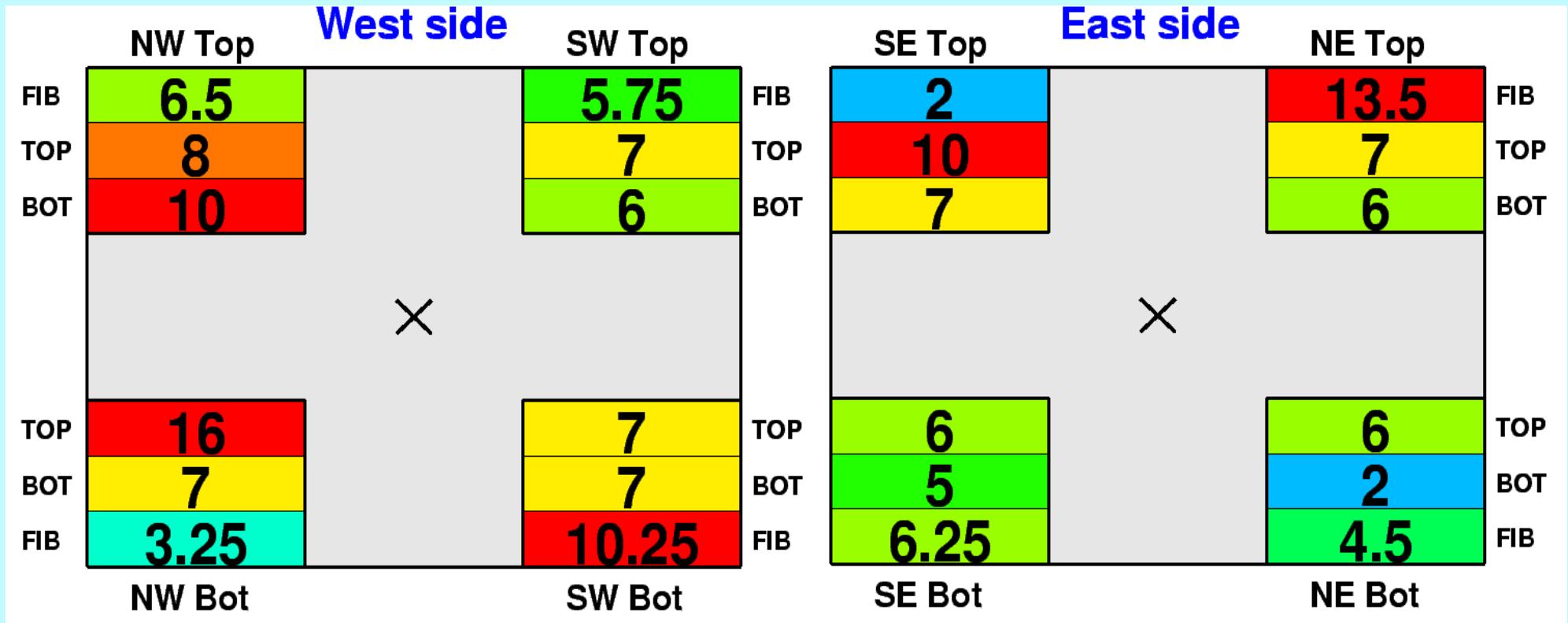
- Anti-proton current increased steady (cor. coeff. = 0.06)
- Proton current stays almost the same (cor. coeff = 0.46)
- Machine improvements



# Combination: CAEN's & FIB's

Data: Feb 2005 – Feb 2006

FIBs divided by 4  
(due to higher rate per crate)



- Some racks are in a more hot region in term of incidents
- Different behavior for west and east slightly visible



# Summary and Conclusion

	<b>CAEN</b>	<b>FIB</b>
<b>West/east side</b>	<b>Tendency, that crates on west side suffer more</b>	<b>Same rate</b>
<b>Lumi per month</b>	<b>Single event upsets (SEU) increase with lumi per month</b>	<b>Slight increase of SEU with lumi per month</b>
<b>Prediction</b>	<b>Will increase with years of TEV operation</b>	<b>Remain almost constant unless p current increases strongly</b>