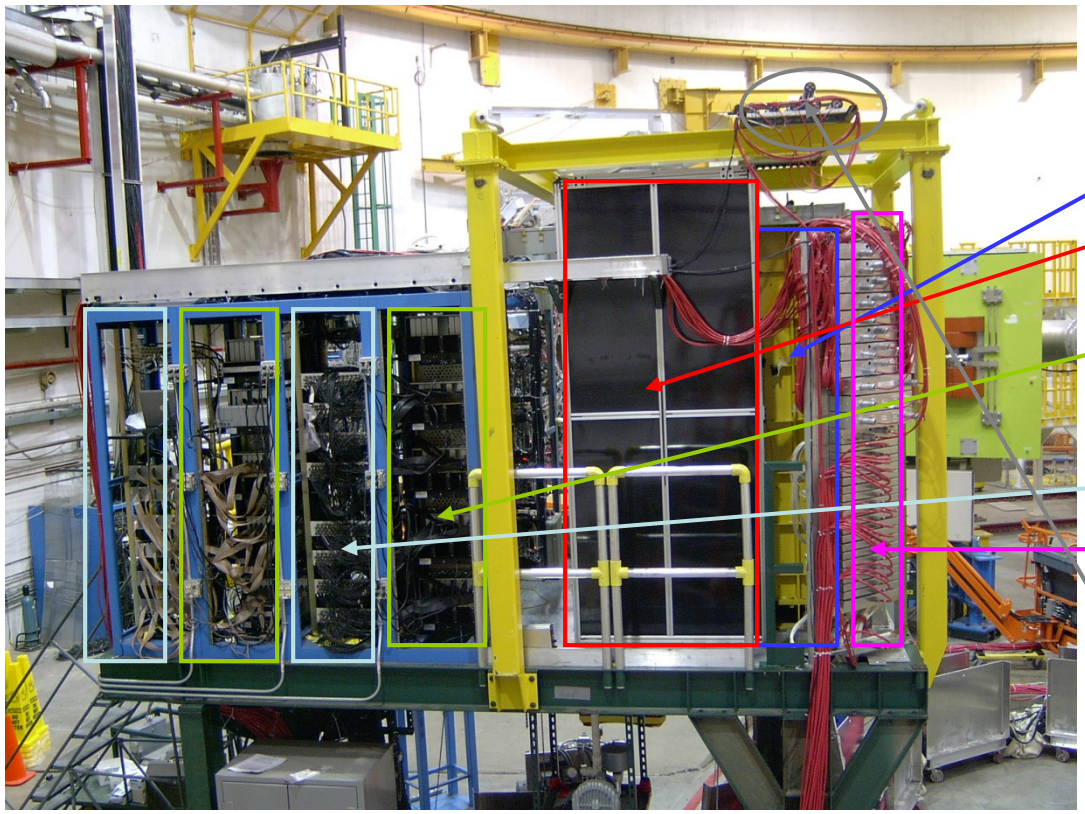
BigCal

- Brief description of the detector
- Safety issues
- Status of annealing glass

Calorimeter Platform



Lead Glass 1744 blocks (4300kg)

Black Box (PMs, bases, patch boards, temperature & door sensors)

Front-End Electronics (incl. trigger)

Booster Power Supplies

Signal Patch Panels

HV Patch Panels

Light Box (monitoring system)

Scintillators (for cosmics)

Absorber (4” Al)

Total: 25,000lb

- Bottom part: 32 x 32 blocks (each 38 x 38mm) from Protvino
- Top part: 30 x 24 blocks (each 40 x 40 mm) from RCS

Same PMs, different bases (Protvino requires booster), patch boards, HV connectors

Calorimeter Platform –Safety Issues

• One can walk on the platform without harness – there is stair to, and fence or detector parts and equipment all around the platform.

• Working outside of the platform to reach the HV patch panels, signal patch panels, or rear side of the electronics (normally not needed), is possible using a step ladder.

• Before entering the black box all the HV chan. and booster supply must be turned OFF. Only experts are allowed to enter the black box. The door is normally locked, there is a sign on the door, and a sensor connected to the HV interlock system.

• All HV chan. must be OFF before doing any work on the light box. Only experts can do this.

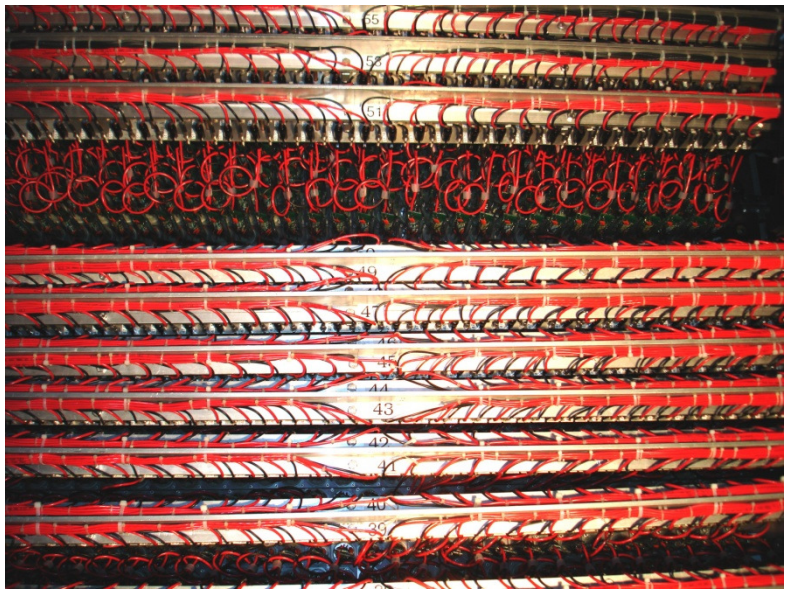
• There are 4 temperature sensors inside the black box adjusted to activate the interlock system above ~120^0F.

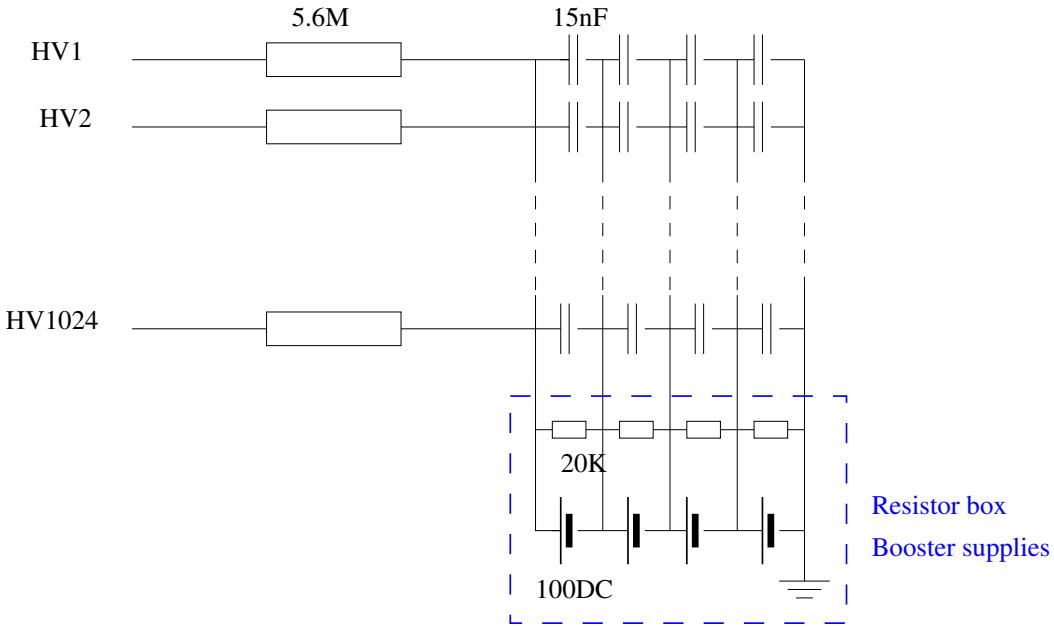
HV subsystem at detector

RCS part:

•High power (~1 Watt/ channel), still no need to cool: temperature increases by 10^0C when turning ON all HV chan.

•Amplifying signals 4.2 times results in much lower HV as compared to previous operation in Hall A -> Lower power and longer life.





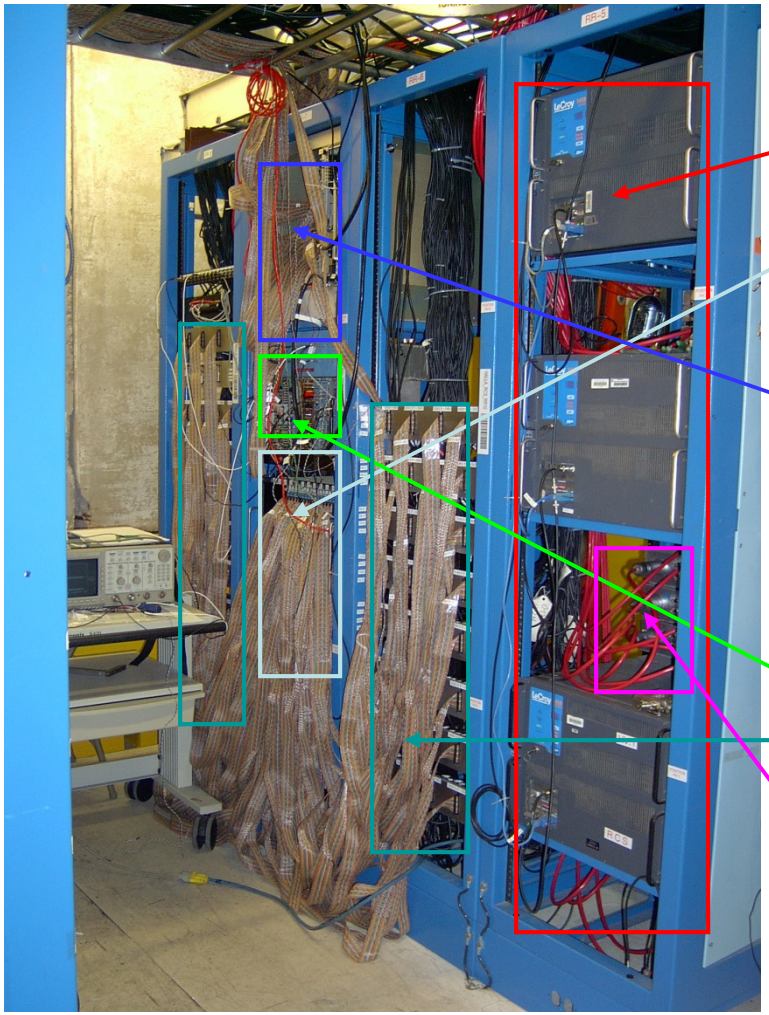
Protvino part:

•Booster supply reduces the current on the bases by a factor of 3-4 (4 units each at -100V/200mA), but all channels are interconnected:

• TURN OFF ALL HV CHANNELS AND BOOSTER BEFORE WORKING ON ANY PROTVINO HV CHANNEL.

•After Gep safety review, upgraded cabling and connections and interlocked 400V to opening the “black box”.

Electronics/HV



In the bunker (Electronics Platform):

LeCroy HV Supplies (6 crates 1104+48 spare chan.), interlocked from BigCal sensors

Two Fastbus Crates with 29 ADCs (1782+74 chan.) and 4 TDCs (262+122 chan.), covered on the back (each ~ +75/-80A for +5V/-5.2V)

Two VME crates: TS and scalers; and slow control system and remote resets

Two CAMAC crates with17 discr. (262+10 chan.) and modules for the slow control system (each ~ +18/-20A for +6/-6V)

One NIM crate: coin. trigger and gates

Signal Patch Panels

HV patch panels

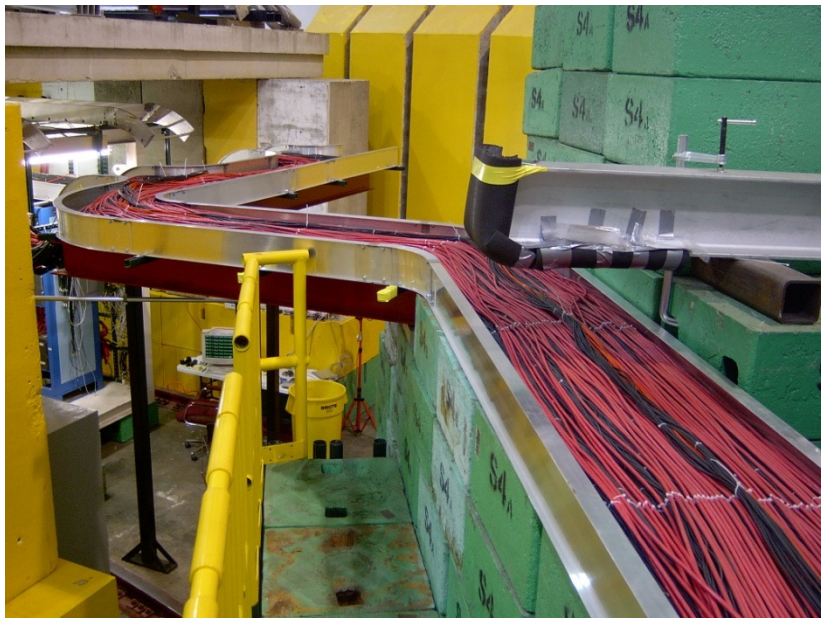
Second floor counting house (G0 electronics):

CAEN HV supplies (11 crates 640+64 chan.) interlocked from BigCal sensors

Counting house (SOS HV supplies):

Two CAEN modules (10+22chan.) used for the scintillators, not interlocked

Cables



1782 + 82 signal cables (100m) for ADC

262 + 18 signal cables (50m) for TDC

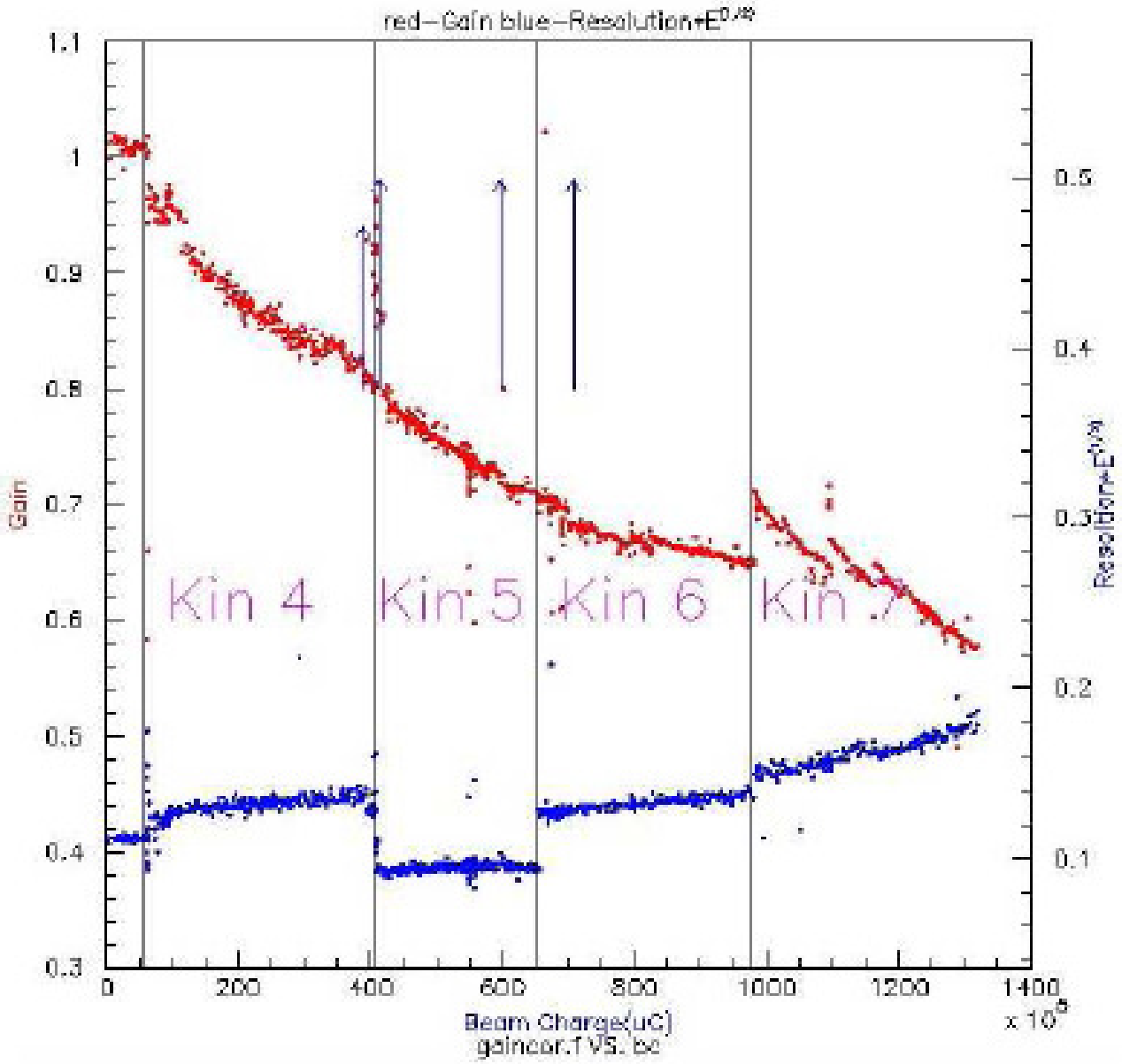
48 HV cables (100m, 24 chan. each) for LeCroy HV

40 + 2 HV cables (40m, 16 chan.each) for CAEN HV

Cables wrapped on the floor and below stairs.

All cables on carts at BigCal side, NO NEED TO DISCONNECT WHEN MOVING DETECTOR. 30-60 min. for repositioning.

Gain and Resolution during last experiment



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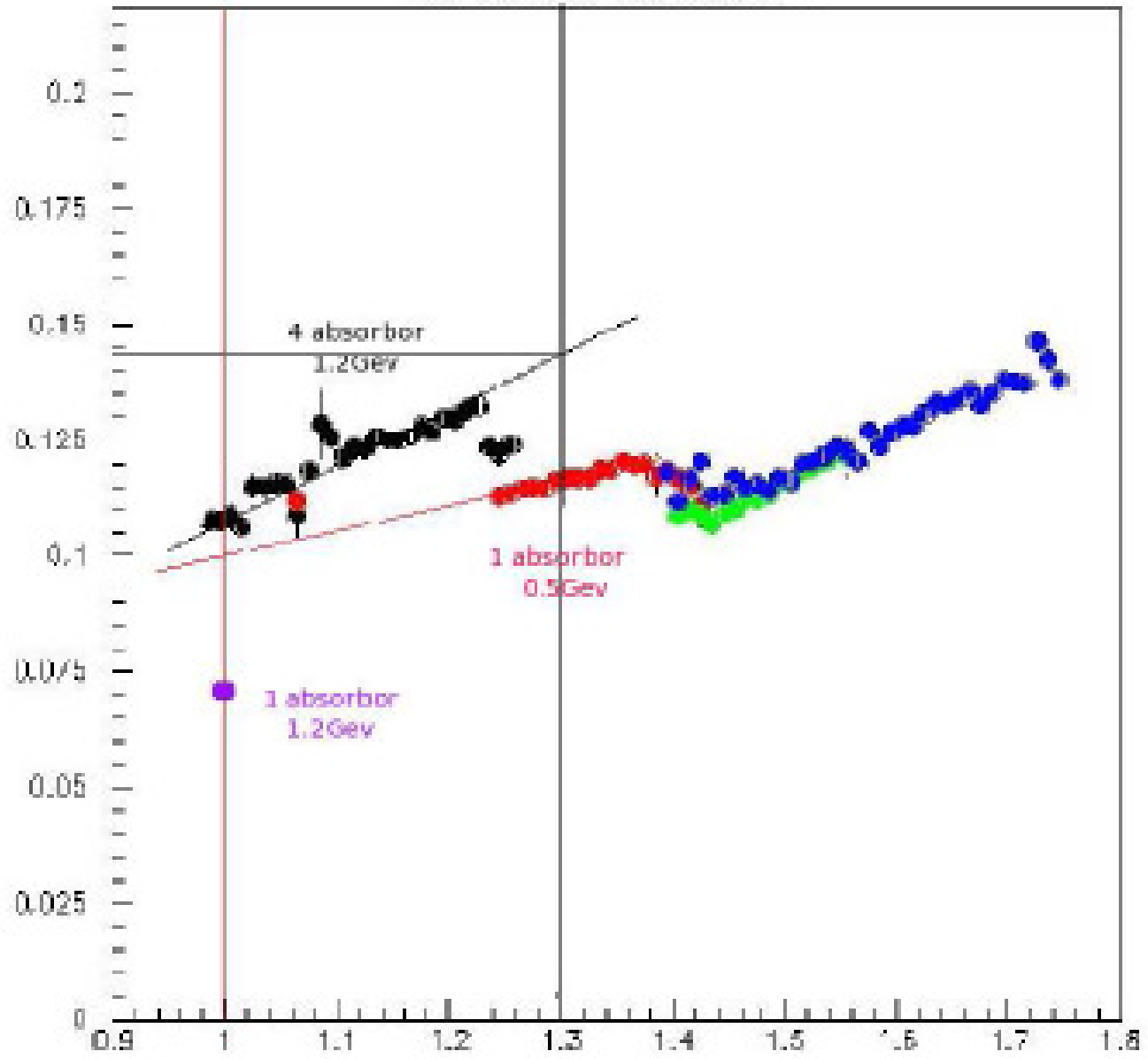
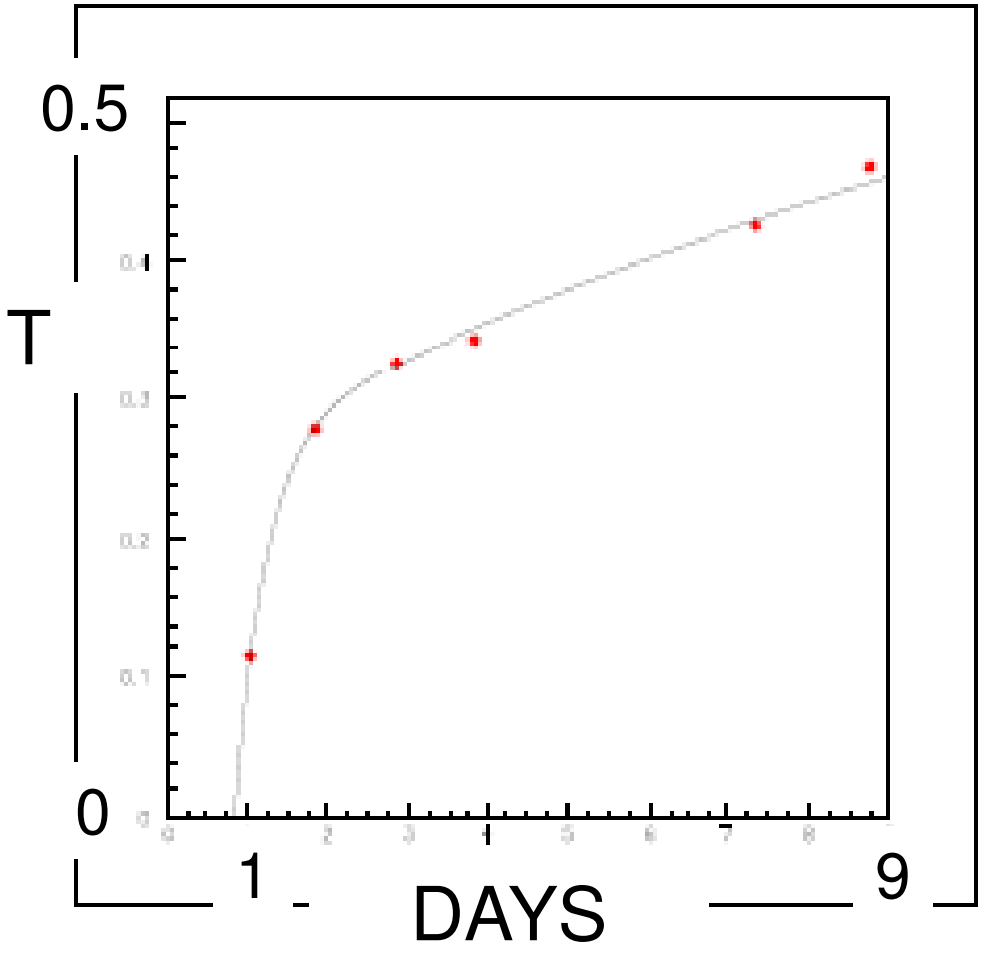


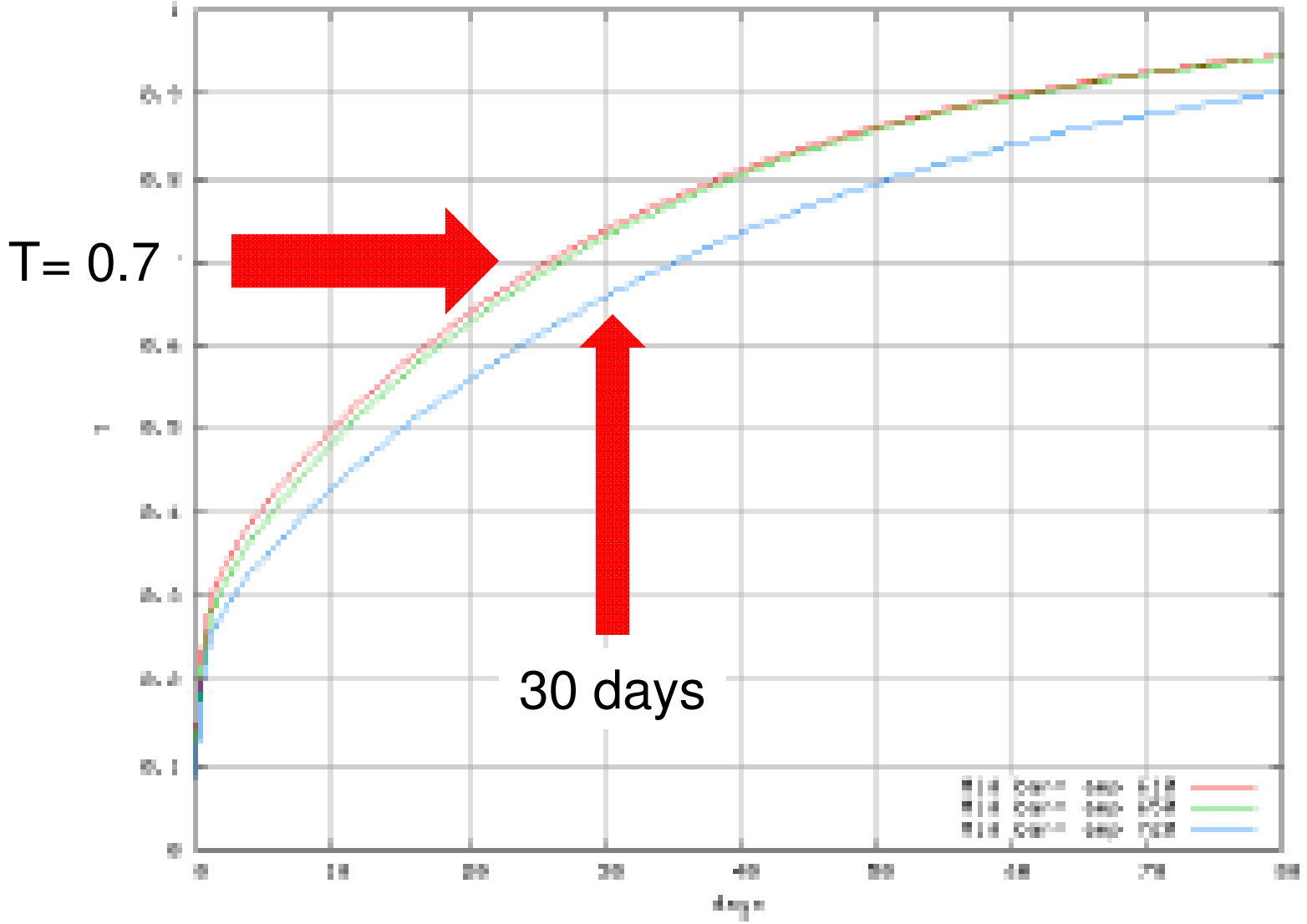
Measurements of Transparency



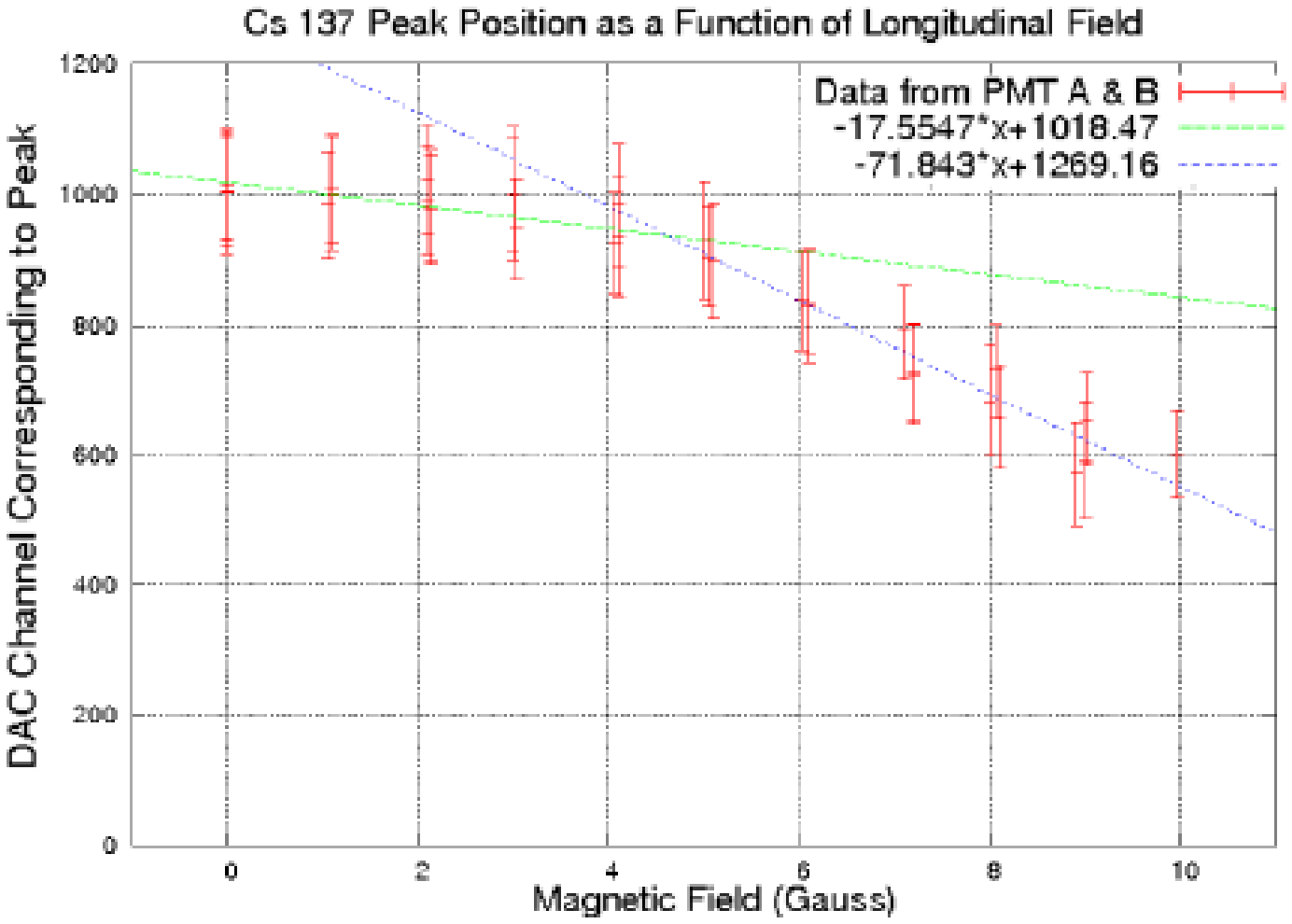
As a test annealed one block and measured how the transparency improved.

Fit the data to estimate how long to cure the glass.

Expected Transparency



Test with BigCal PMTs in magnetic field



Test with BigCal PMTs in magnetic field

	Big Cal Point	Gain Shift Due to B Field (%)	Corresponding HV Shift (%)
	B	32.38	4.38
80°	D	34.64	4.68
	F	41.55	5.62
	B	41.55	5.62
0°	D	34.63	4.68
	F	32.38	4.38
	B	21.31	2.88
WACS	D	4.1	0.55
	F	0.34	0.05

STATUS AND CONCLUSIONS

- BigCalorimeter worked well during recent Hall C experiments

- Annealing of lead glass has begun and expect to reach about 70-80% of maximum transparency. Expect energy resolution to be about 8%/sqrt(E) .