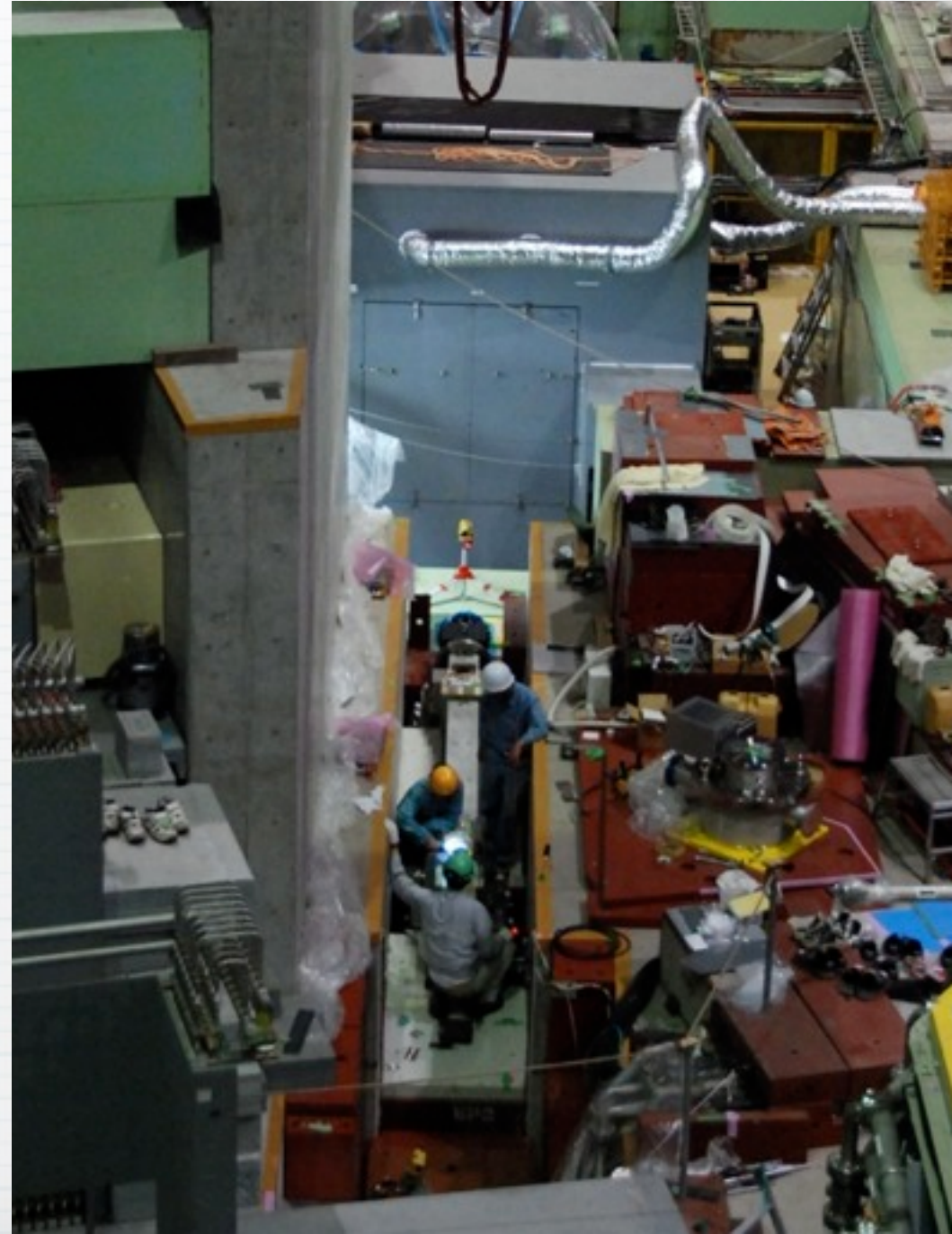


Status of E14 KOTO

Taku Yamanaka
Osaka Univ.
Jan. 13, 2012
J-PARC PAC@KEK

Beamline

- * Realigned Collimators in Sep.
- * Ready for beam

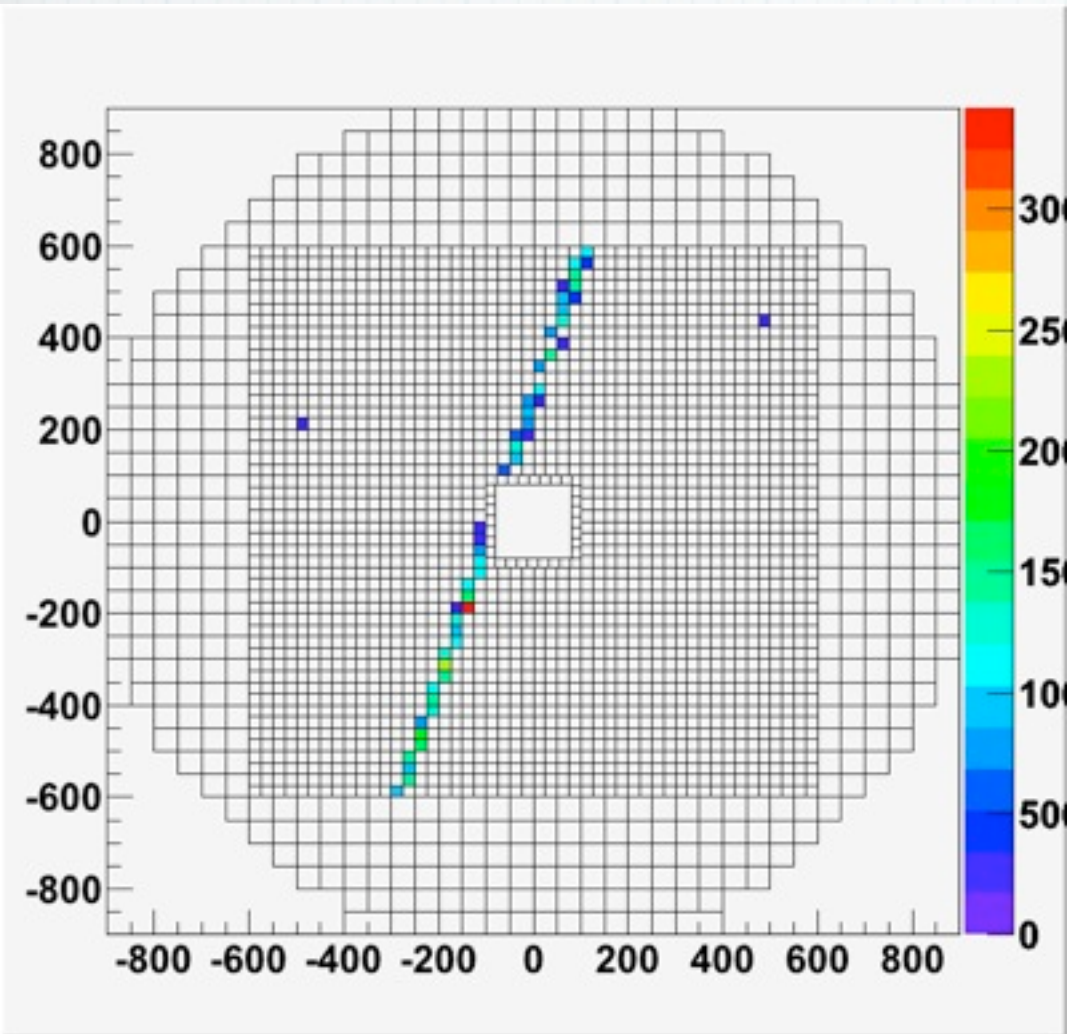


Csl Calorimeter Test in Vacuum

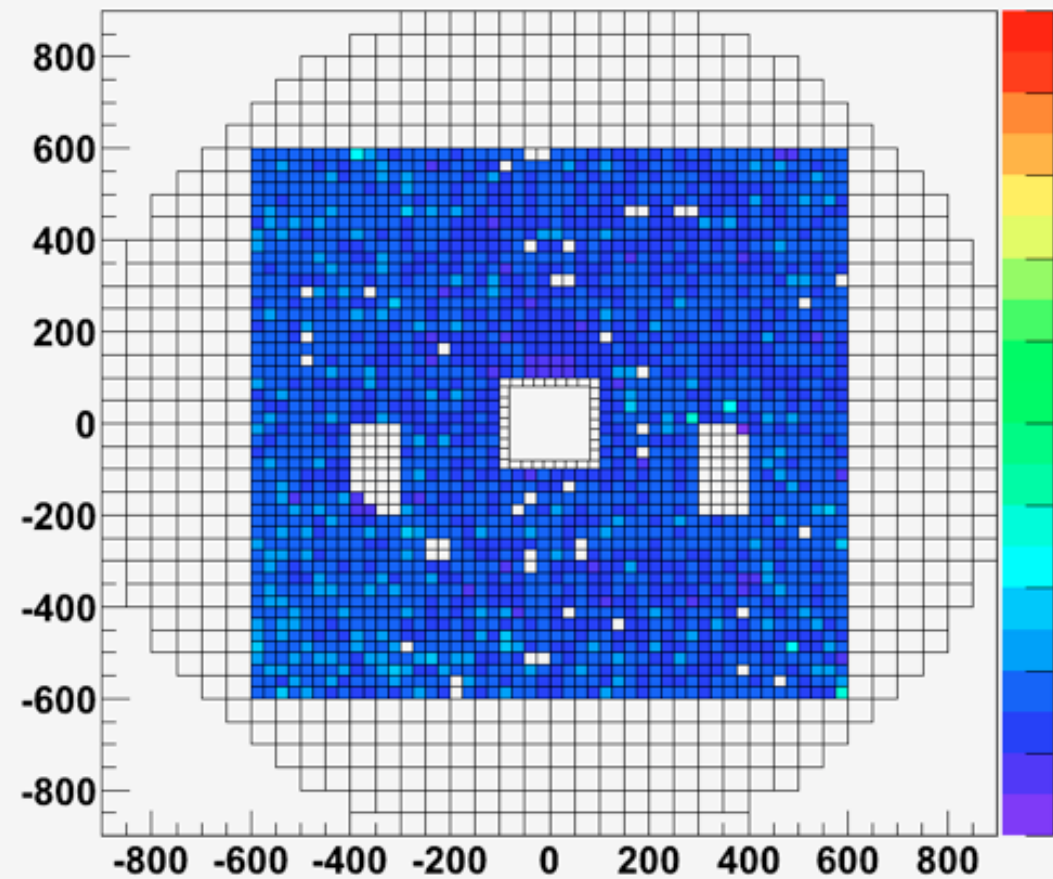
Aug-Sep, 2011



Cosmic rays



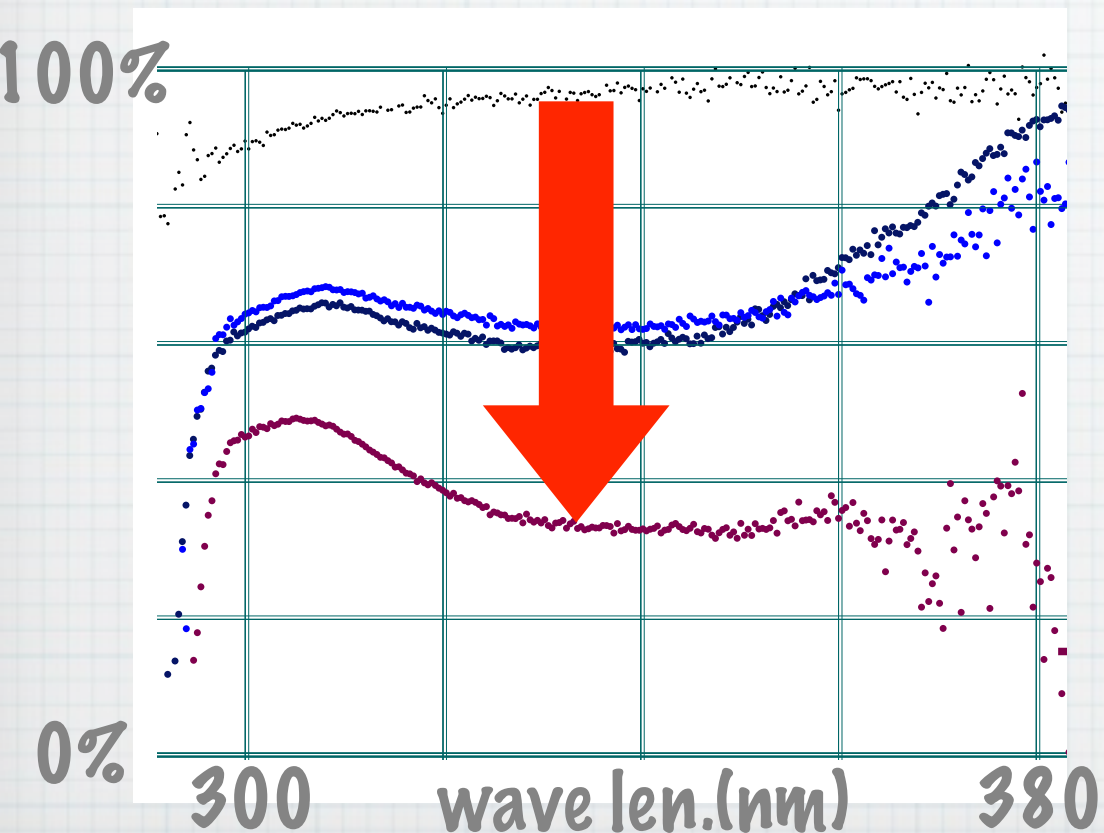
Vacuumtest light yield



Problem #1

UV transmission

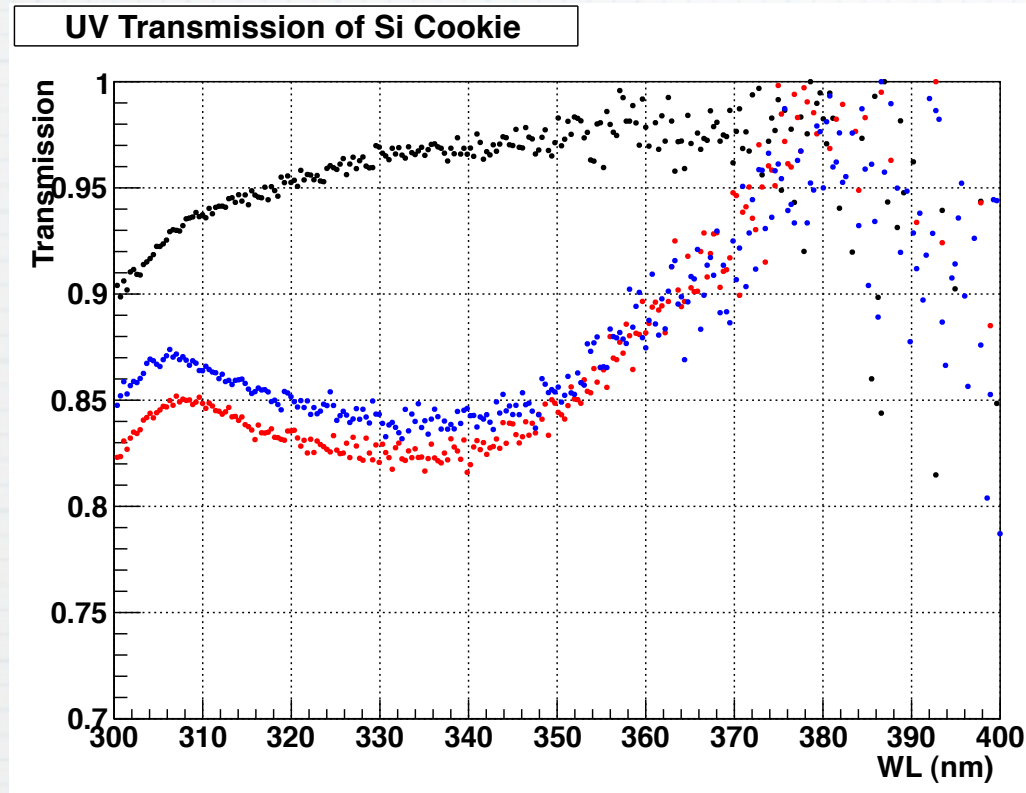
- * UV transmission of a silicone cookie between Csl and PMT dropped



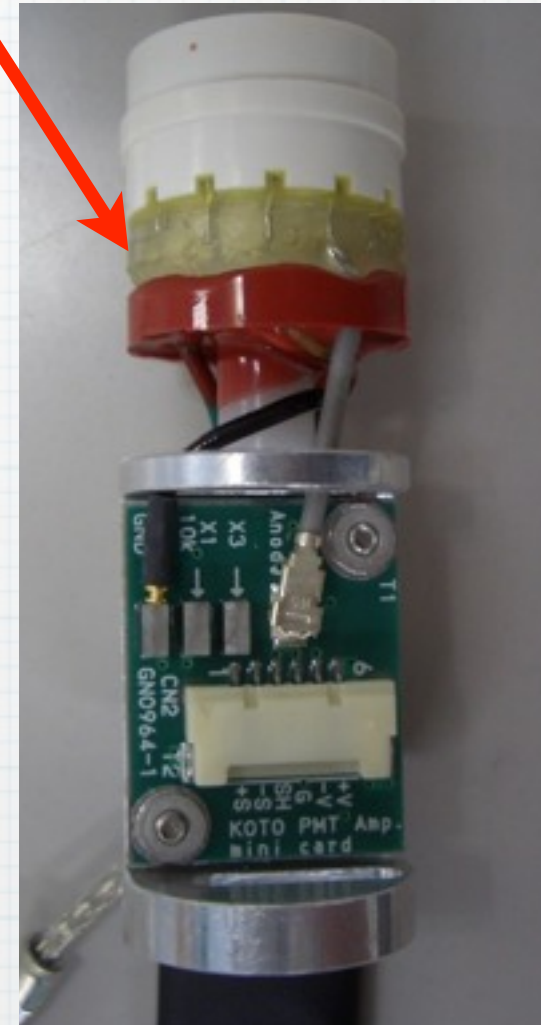
- * Placed various items in vacuum w/ cookies



Culprit was the outgas from a potting material



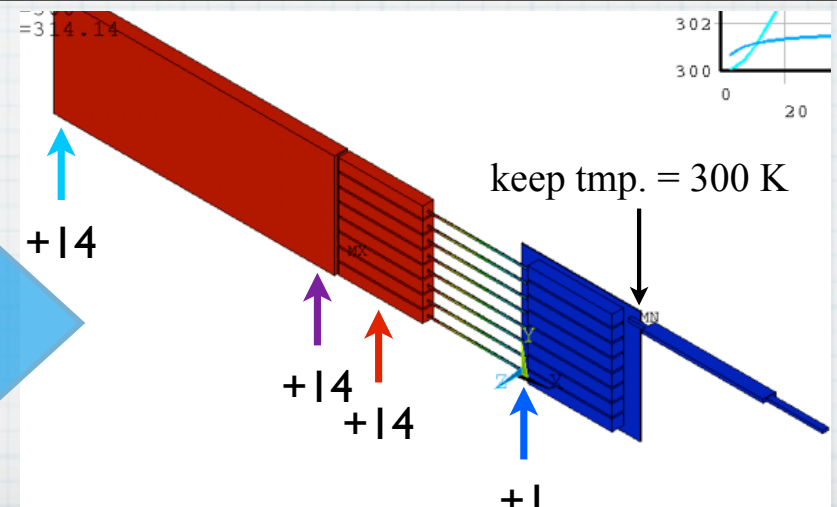
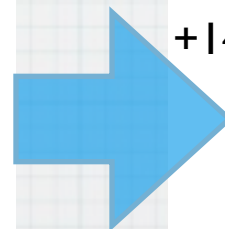
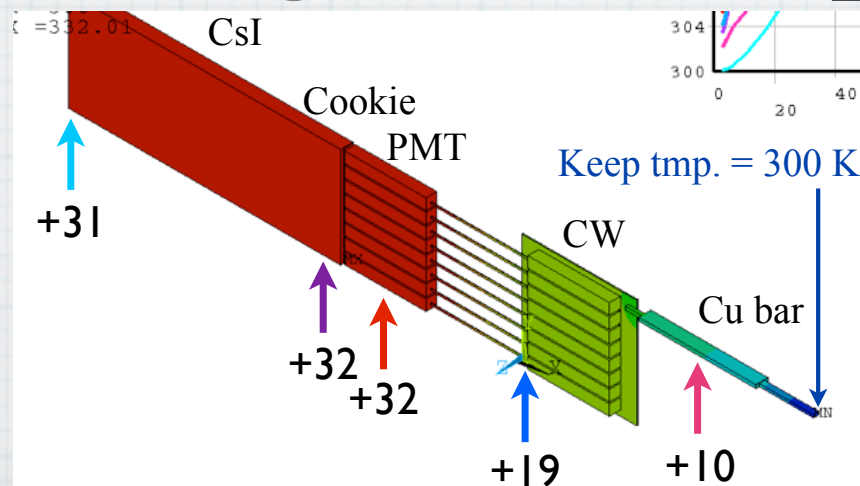
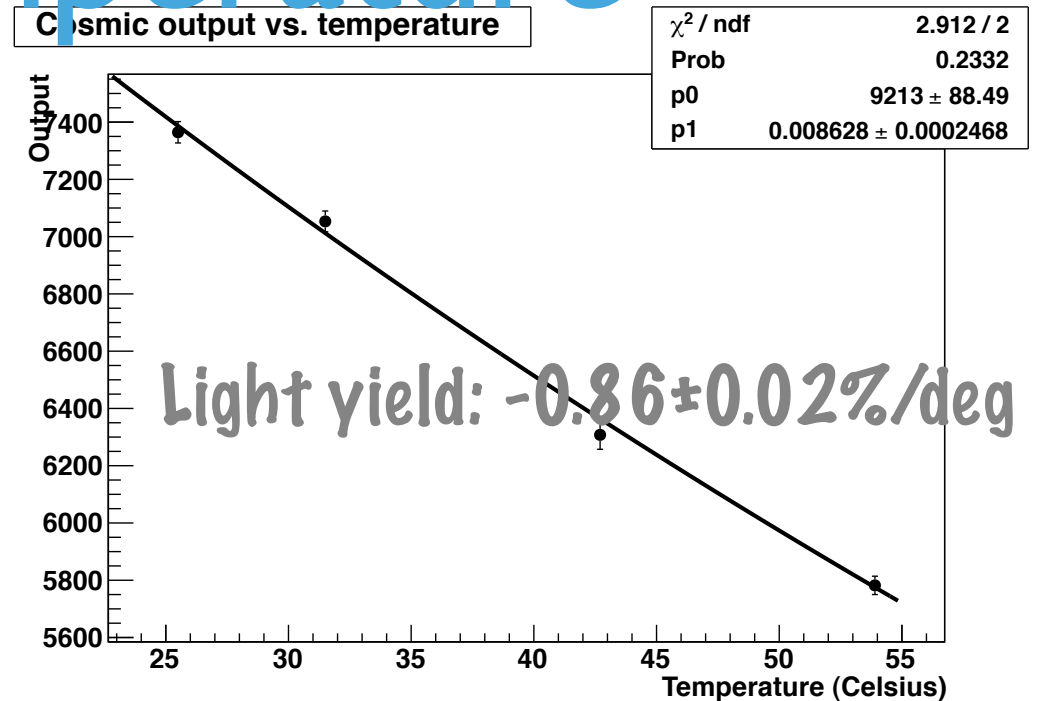
- * We will bake the CW bases and clean other items



Problem #2

CsI temperature

- * Temperature rose ($\sim 20^\circ\text{C} \rightarrow 35\sim 43^\circ\text{C}$), and reduced the light yield by 20%
- * Will improve the cooling



Problem #3

Damaged preamps

- * 0.8% of preamps on PMTs were damaged due to discharge in vacuum
- * Remaking new preamps with protection circuit
- * Will be delivered from Feb.

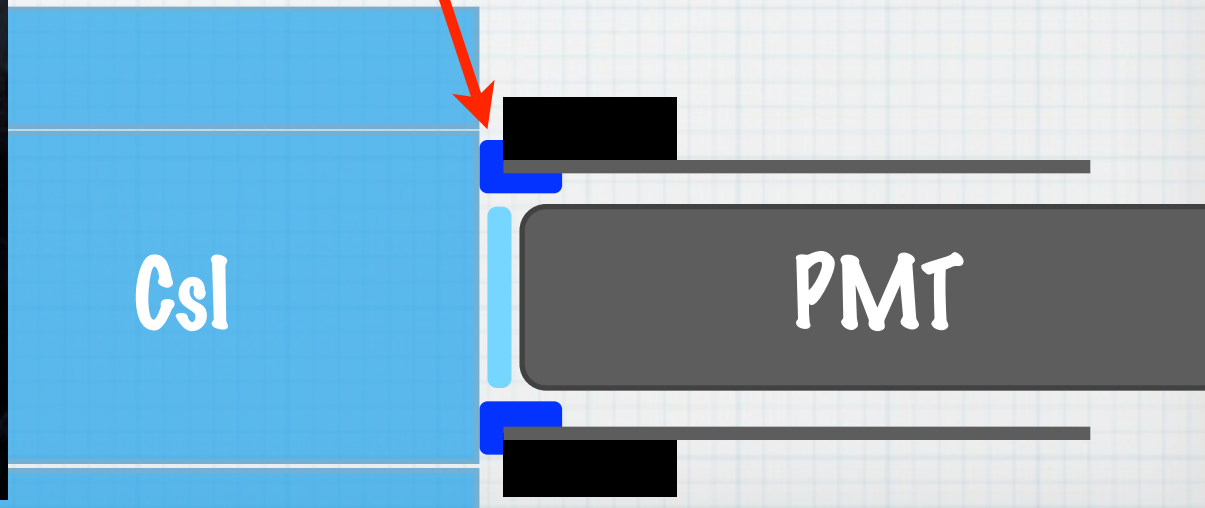


Protection against earthquakes

* Cover in front

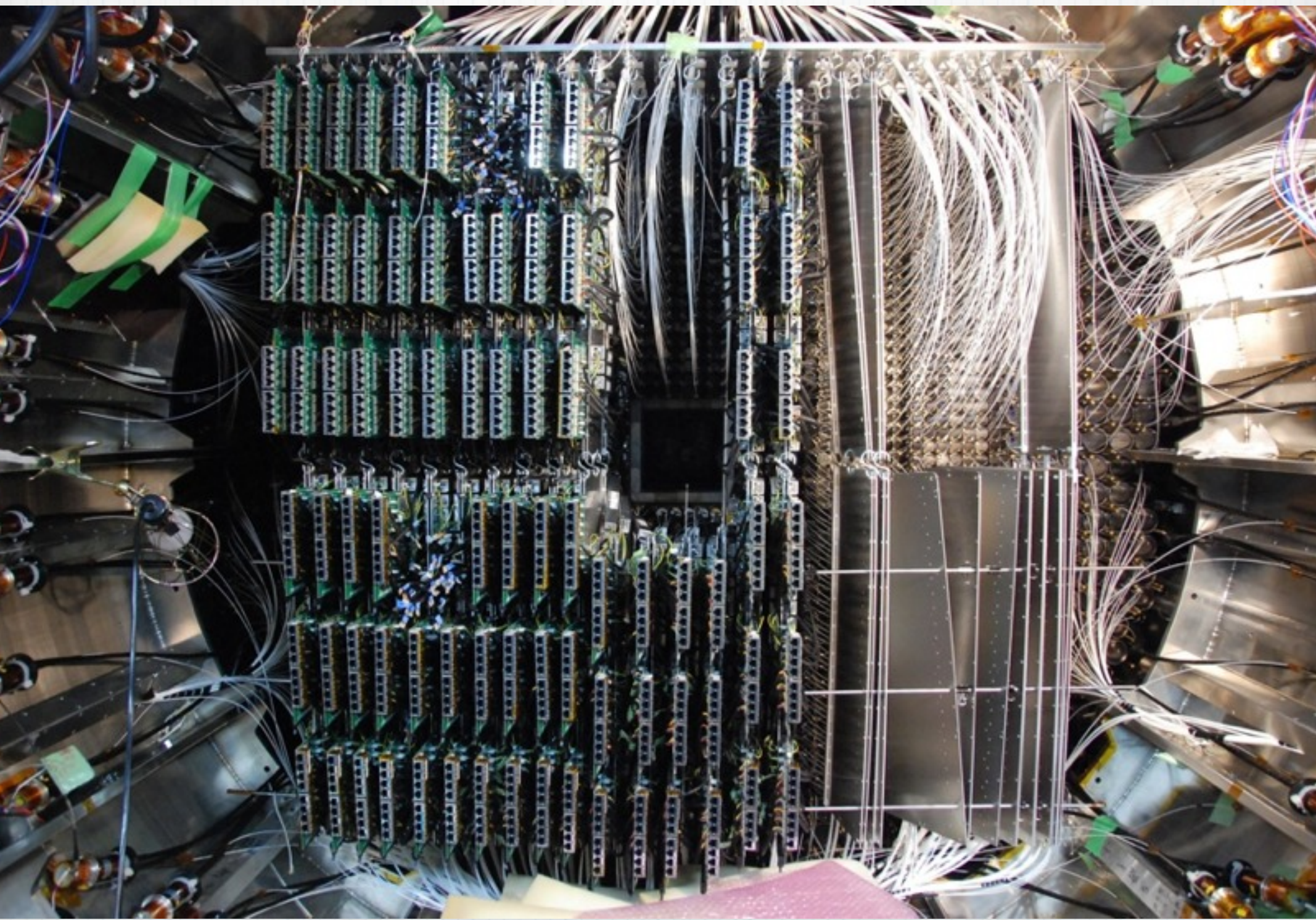


* Cushion in the back



Repair work was underway for beam in May

- * Replace silicone cookies
- * Replace preamps
- * Install cushions
- * Clean vacuum pump oil
- * Prepare to bake CW bases and cables
- * Upgrade cooling mechanism
- * ...

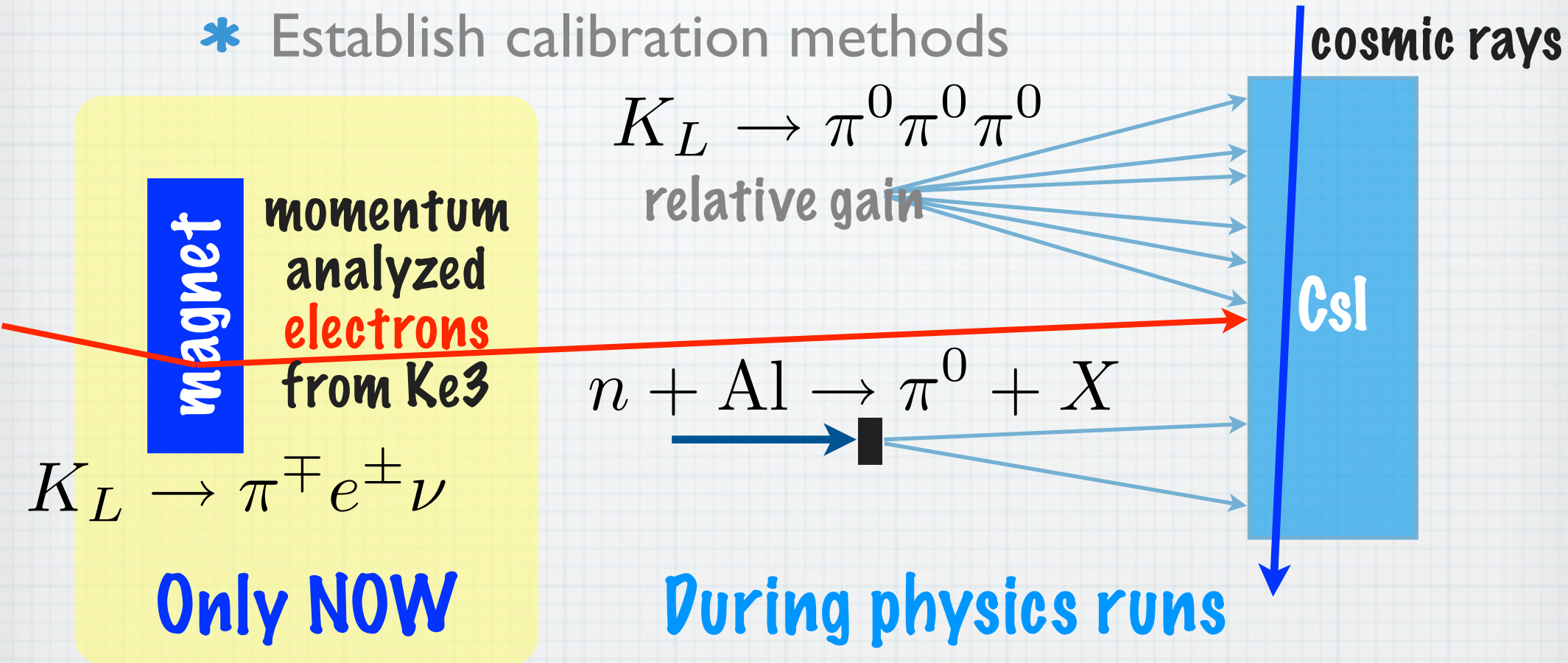


Beam in Feb!

Run Plan for the
Feb
+ Mar or June

Purpose

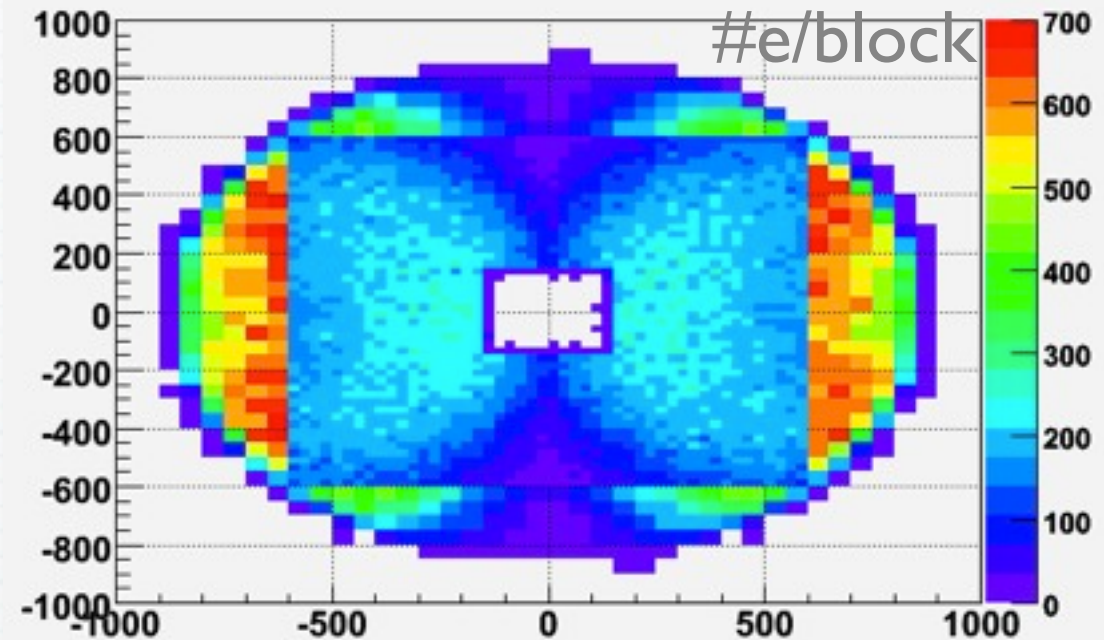
- * Establish calibration methods



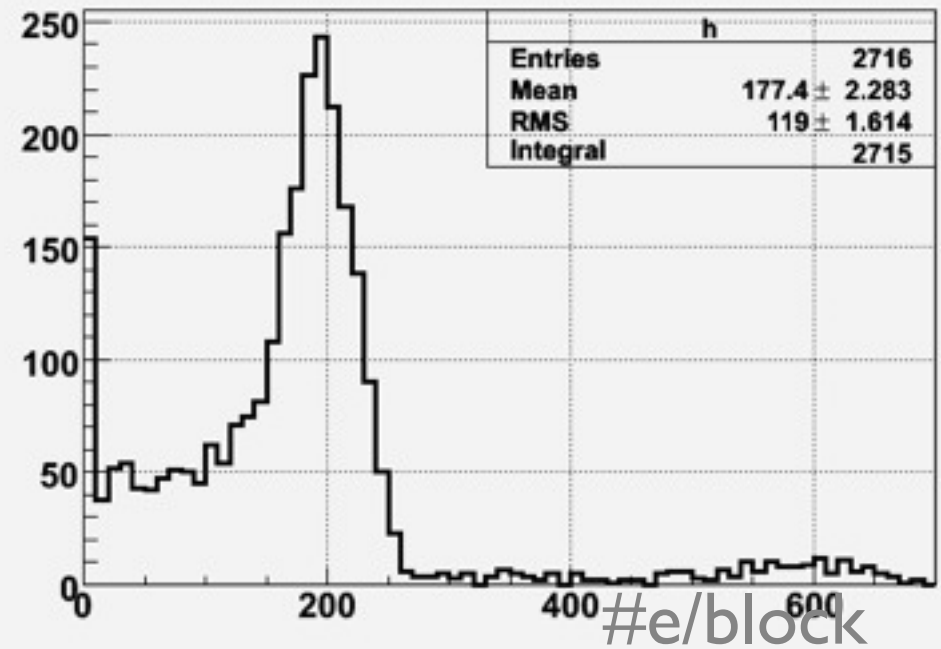
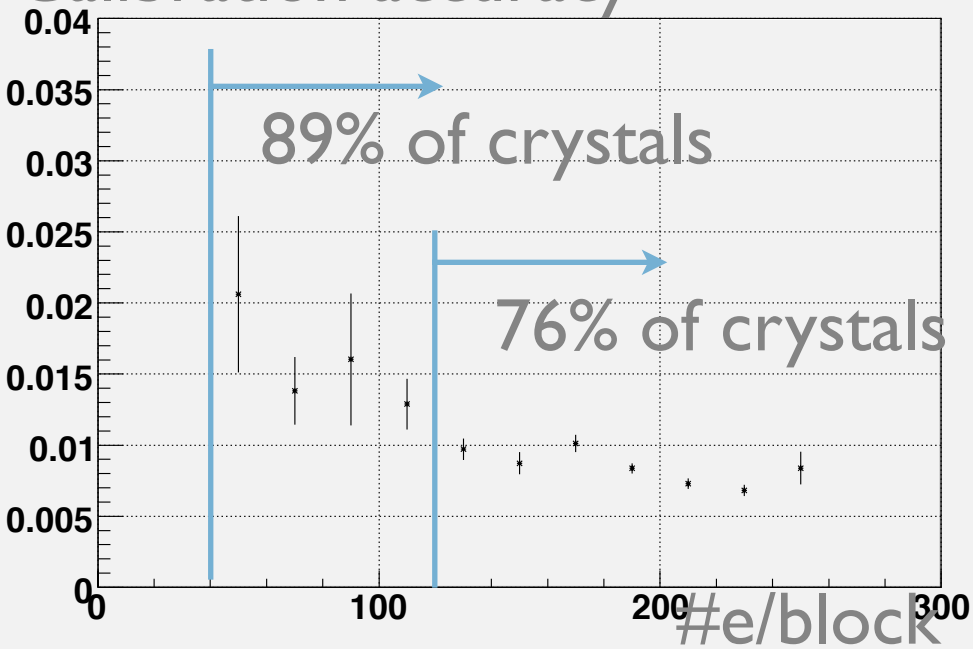
- * Check detector response with electrons with known position and energy

Ke3 data

- * 3kW x 2weeks with slow DAQ (500evts/spill) via VME



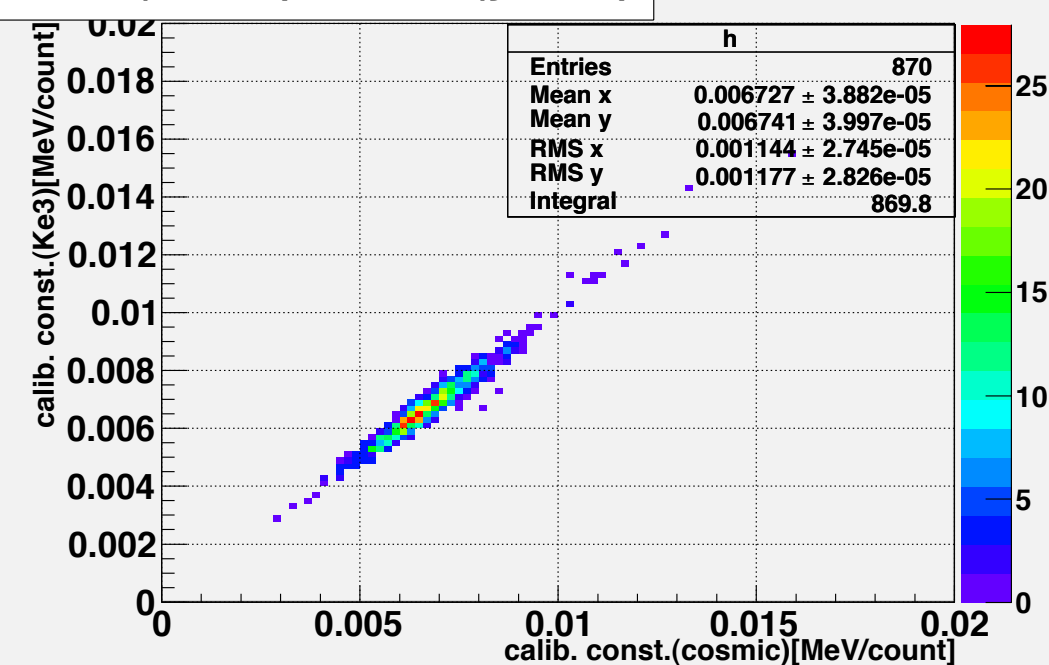
Calibration accuracy



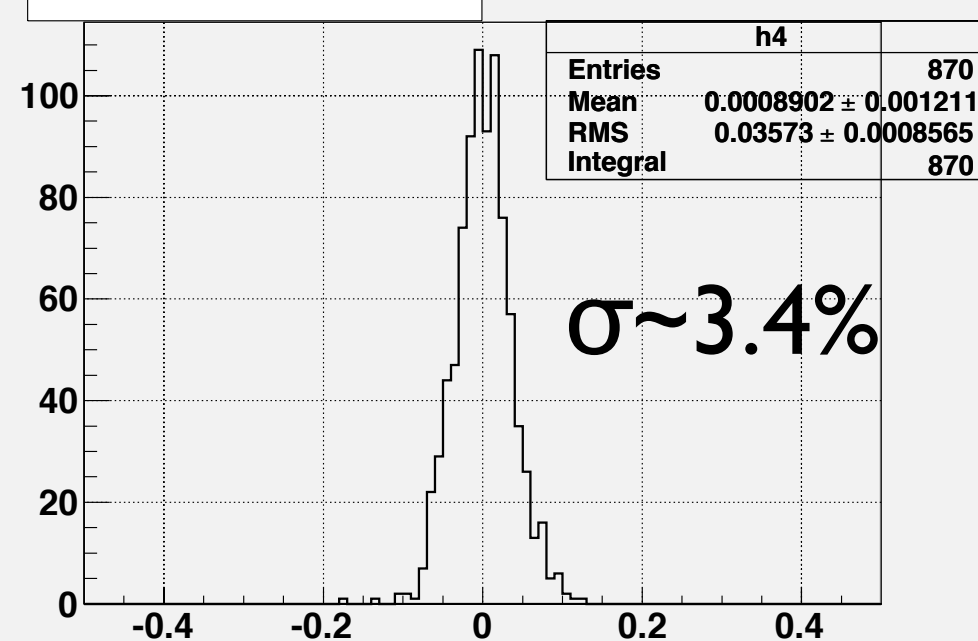
Calibrations by Ke3 vs cosmic rays (50h run in 2010)

- * Good correlation
- * Need higher statistics

cosmi(x-axis) VS Ke3(y-axis)

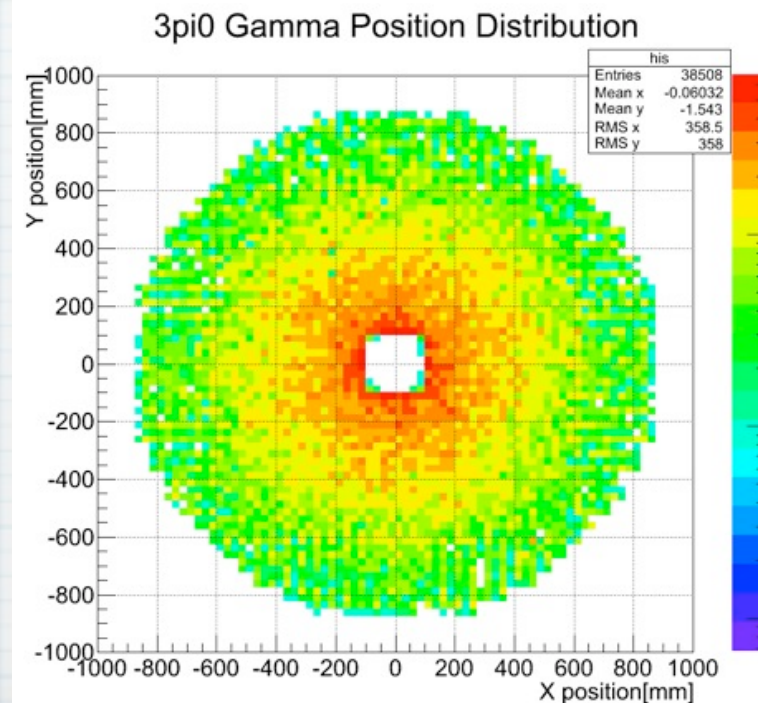
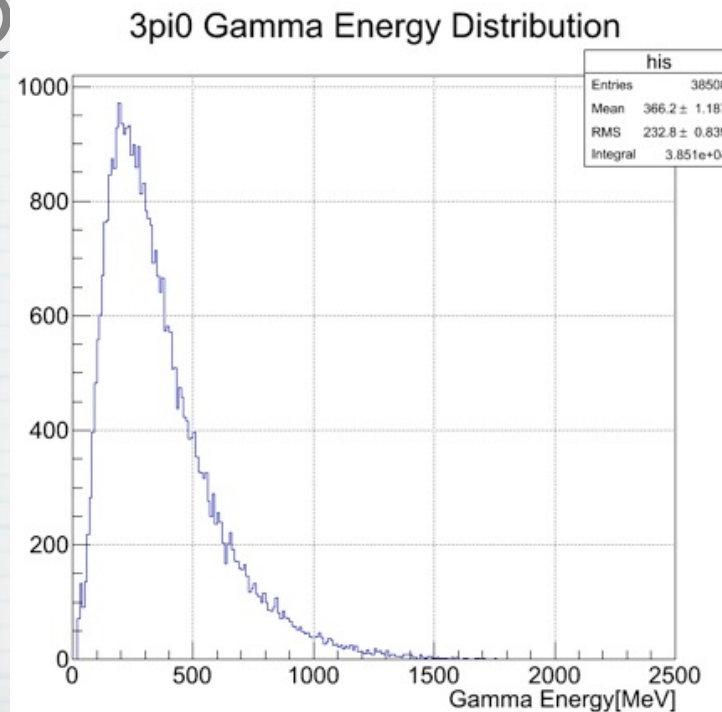
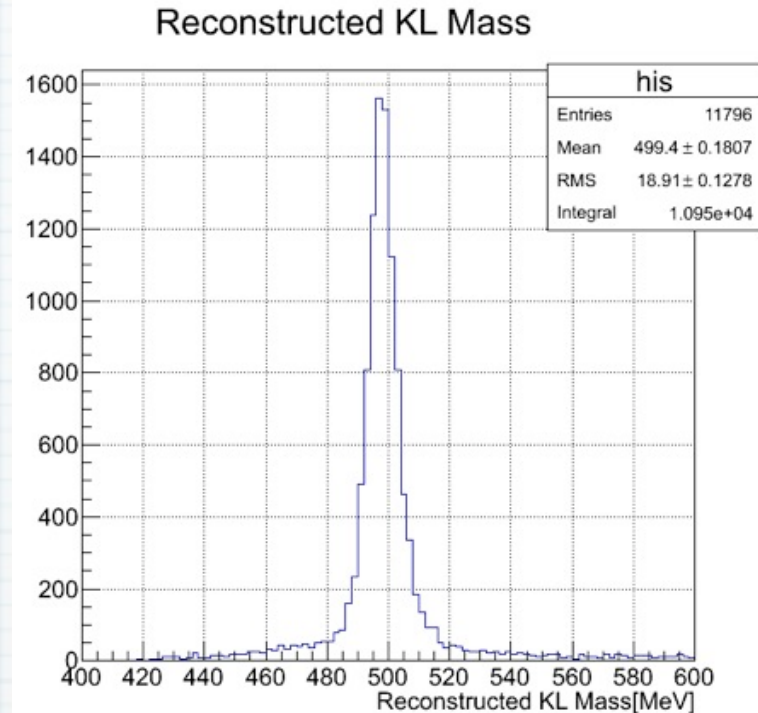


(Ke3-cosmi)/cosmi



$KL \rightarrow 3\pi^0$ sample

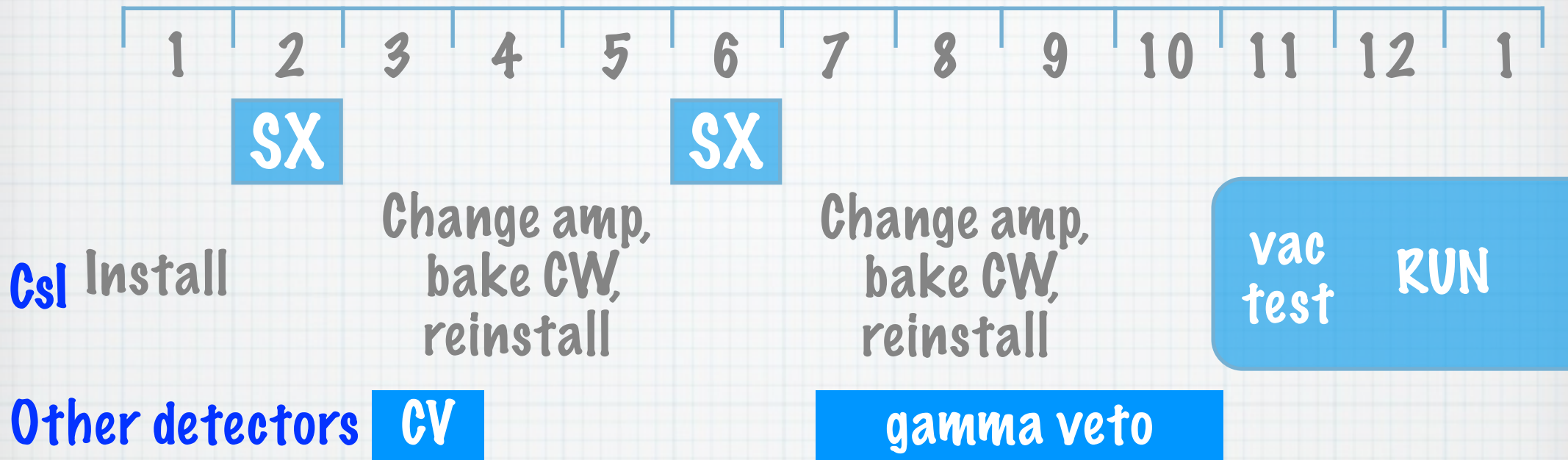
- * Require $E_{\text{tot}} > 500 \text{ MeV}$, and no charged particles
- * 12 events in 3.5k triggers/3kW spill
- * Need 1 week to collect 0.5M evts with fast DAQ



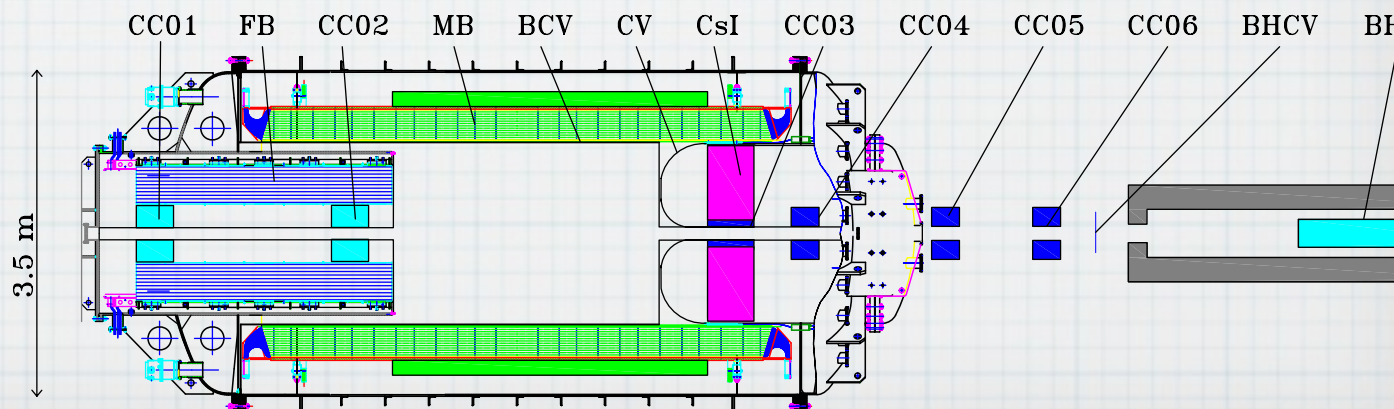
We need:

- * February
 - * 2~3 days to check beam shape and startup
 - * 2 weeks for Ke3 (assuming 500/spill VME readout)
- * March or June
 - * 2 weeks for $3\pi^0 + \text{Ke3}$
 - * 1 week for π^0 s produced run
 - * 1 week for startup + CV tuning (if June)

Feb+June



- * Multiple removing/installations
- * Can't take beam in October



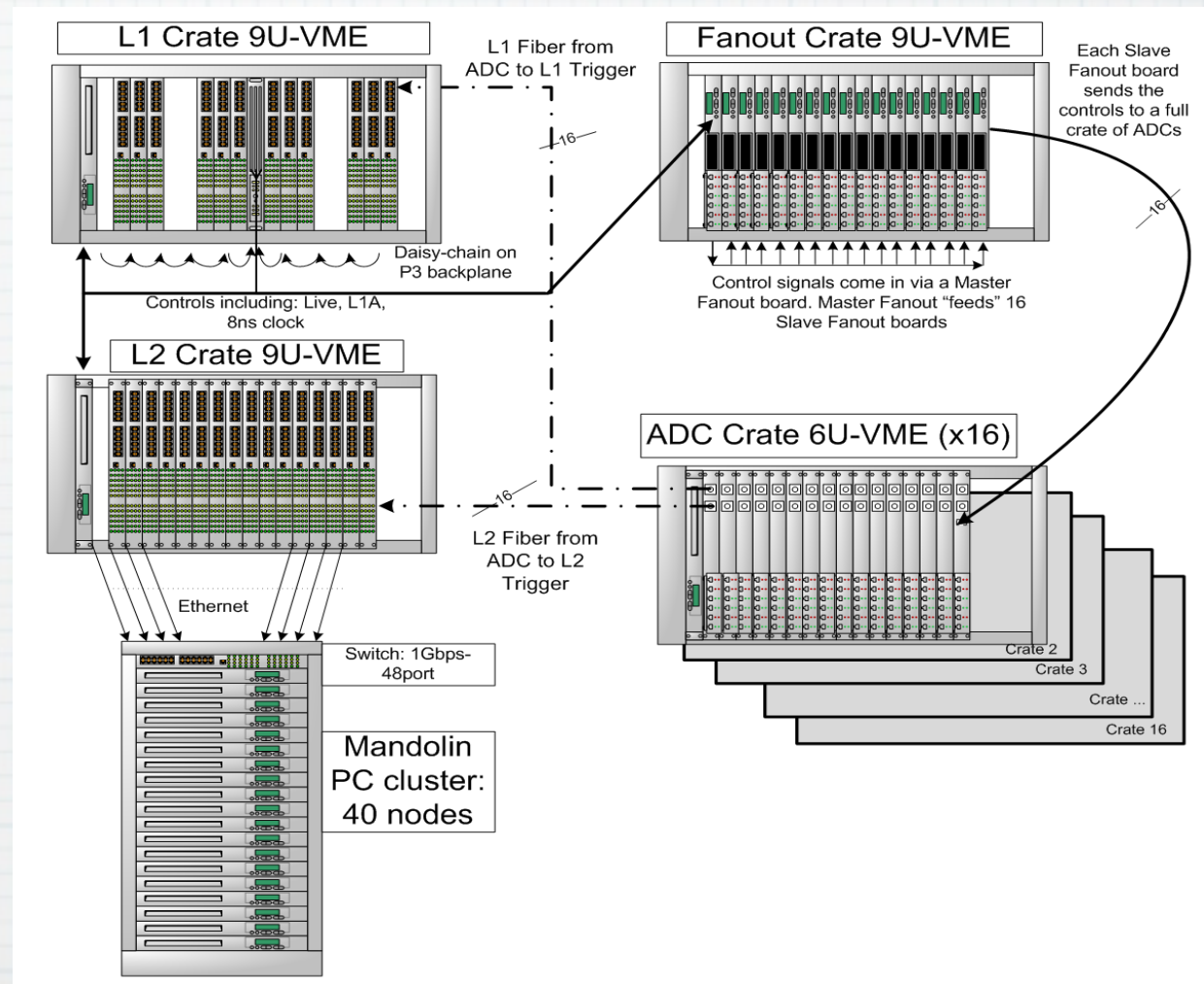
Physics Run

- * Nov/Dec of 2012~ (10kW)
 - * >2weeks: Engineering Run in air
 - * >2weeks: Engineering Run in vacuum
- * Spring 2013 : Commissioning & Physics run (beyond E391a)
- * May~June, 2013 (~4weeks+): Physics run for the G.N. limit
- * Summer: linac upgrade

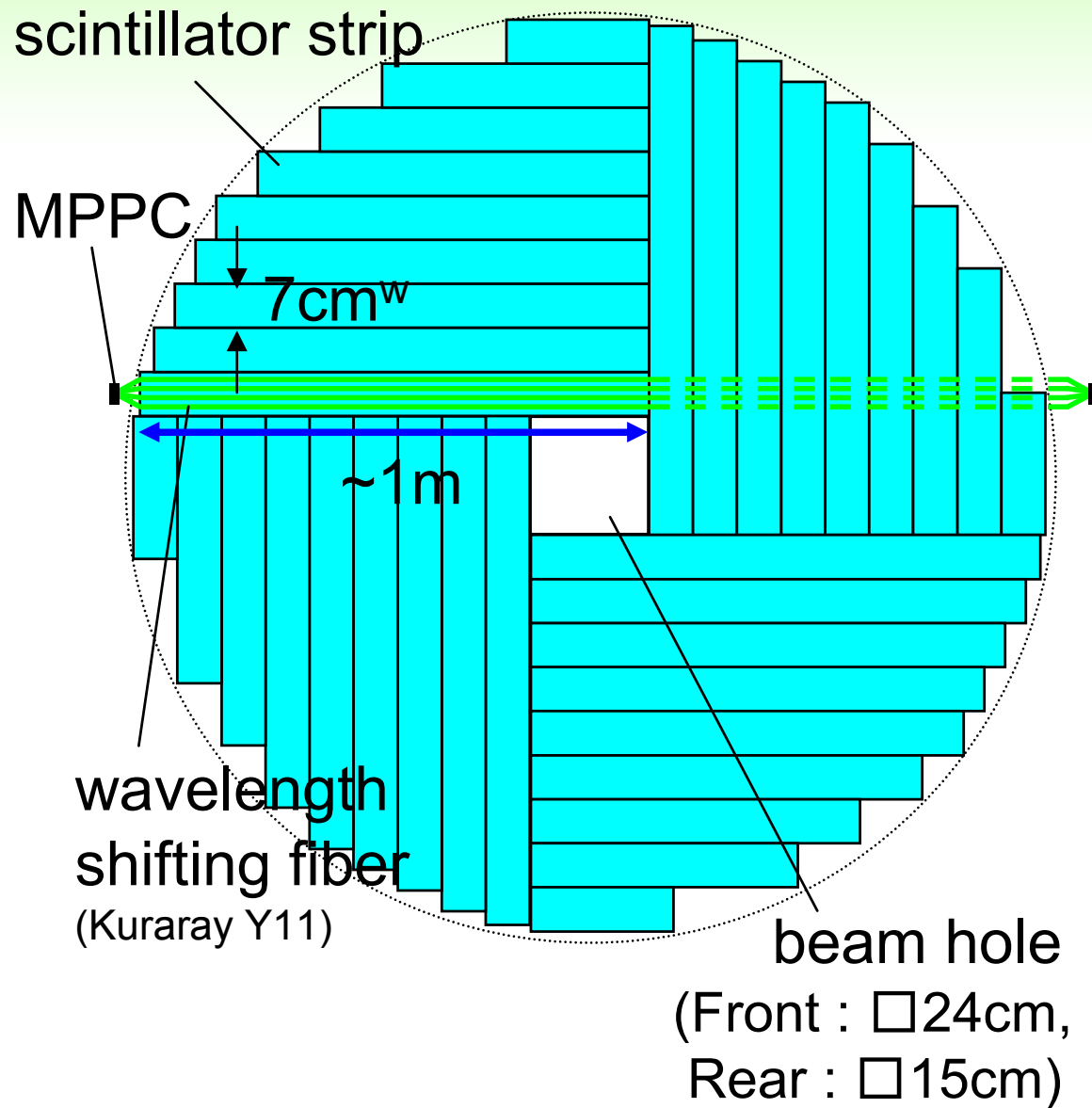
DAQ

* Readout via VME works: 500evts/spill

* Optical fiber readout for (Feb), Mar/June runs: >2k/spill



Charged Veto

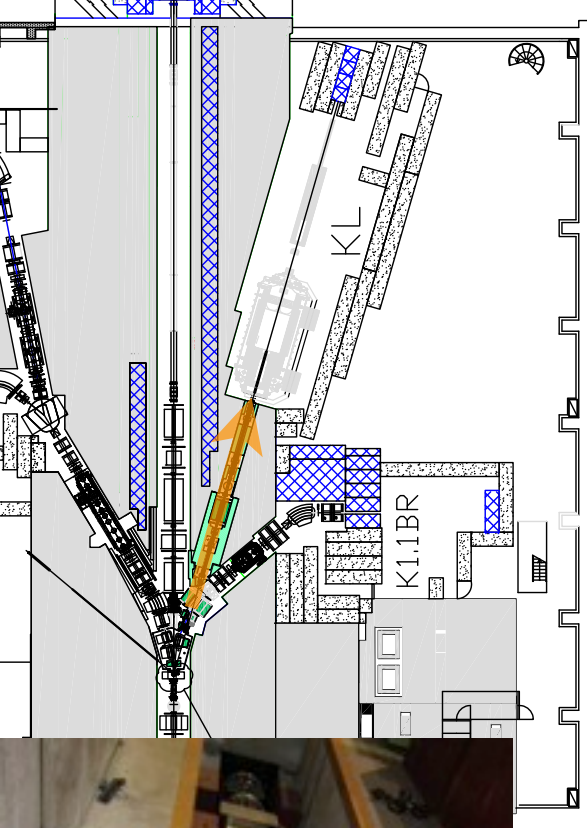


Publications

- * “Development of a Neutral Beam Profile Monitor”, G.Takahashi *et al.*,
Japanese J. of App. Phys., 50, 036701 (2011)
- * “Measurement of KL flux at the J-PARC neutral-kaon beam line”, K.Shiomi *et al.*,
Nucl. Inst. Meth.A664, 264 (2012).

Summary

- * Calorimeter ~worked in vacuum
- * Fixing problems found in the vacuum test
 - * Outgas, heat, preamps, discharges
- * Electron run in February
- * $3\pi^0 + K^0 + \pi^0$ runs in March or June



new KL beam line (south area of Hadron Hall)
confirmation of neutral kaons (December 2009)

flux measurement
 by reconstructing
 $K_L \rightarrow \pi^+ \pi^- \pi^0$

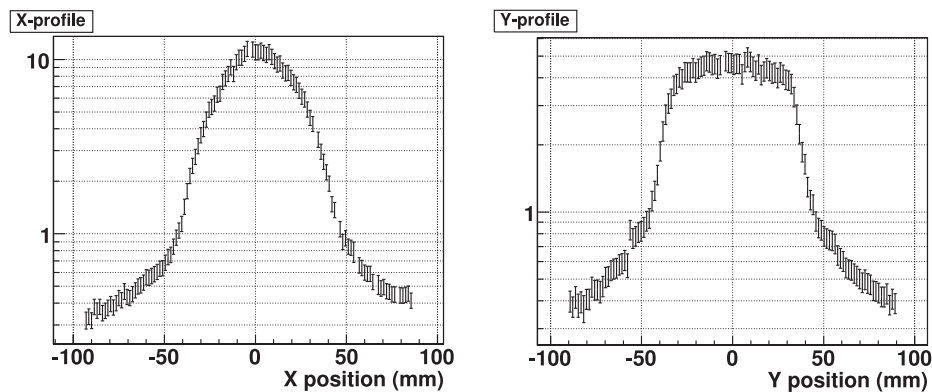


Fig. 7. Beam profiles after the collimators were adjusted.

Nuclear Instruments and Methods in Physics Research A 664 (2012) 264–271



Contents lists available at SciVerse ScienceDirect
**Nuclear Instruments and Methods in
 Physics Research A**

journal homepage: www.elsevier.com/locate/nima

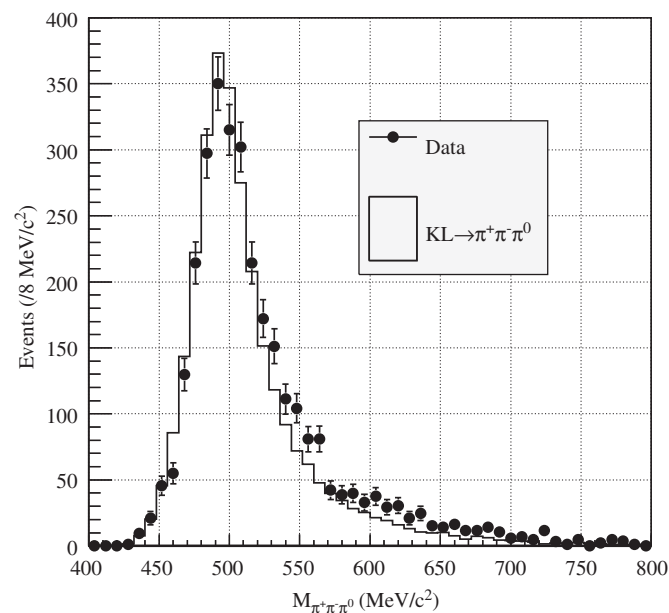


Fig. 7. Invariant mass distribution of $\pi^+ \pi^- \pi^0$ after imposing all the kinematical cuts except the cut on $M_{\pi^+ \pi^-}$. Dots with bars indicate the data and a histogram shows the $K_L^0 \rightarrow \pi^+ \pi^- \pi^0$ signals from the simulation result.