

Setup of Triplet Polarimeter at JLab

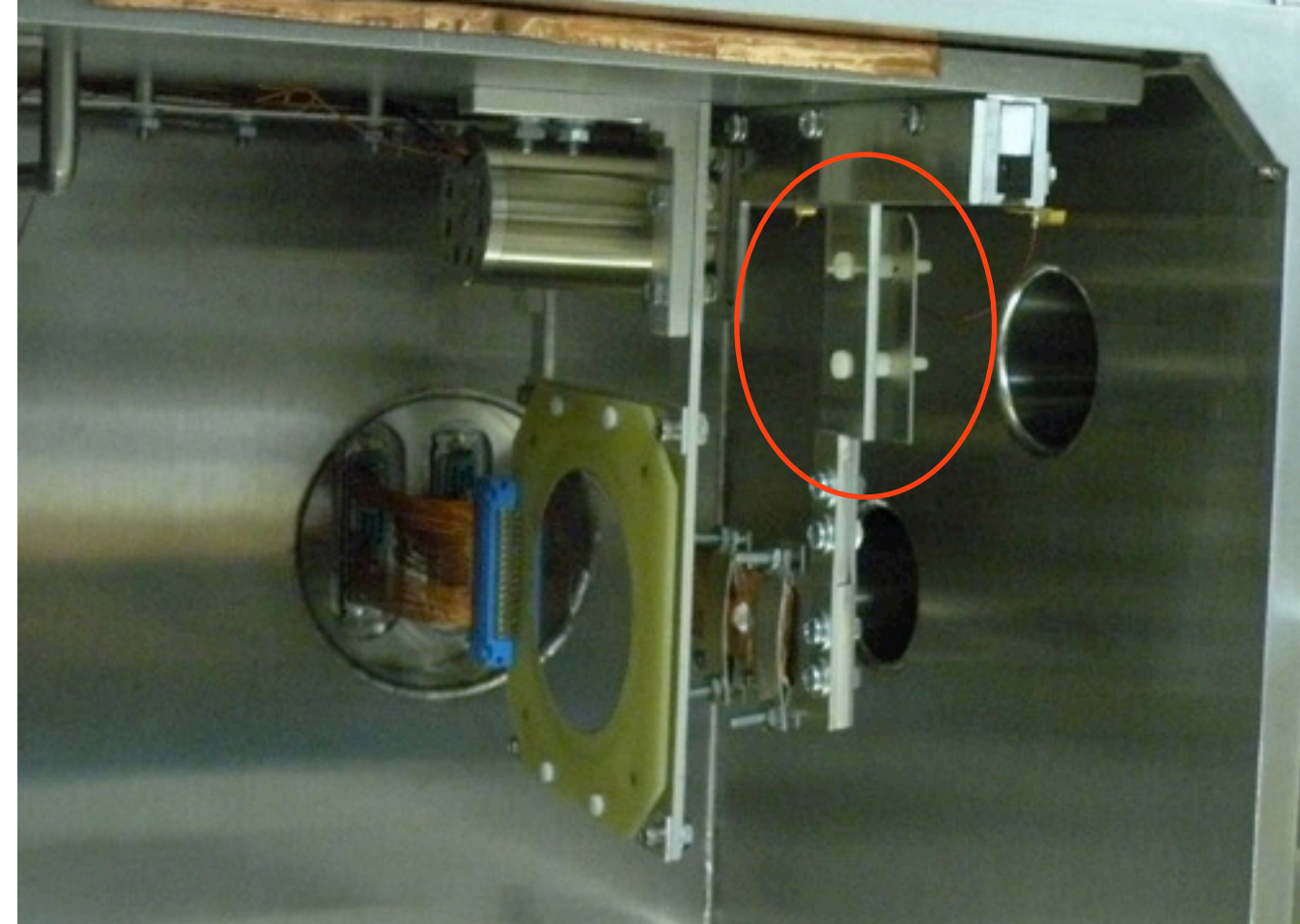
- Motor setup (4/2, 4/3, 4/6)
- Survey (4/7)
- Installation in hall (4/8, 4/9)

April 8, 2015

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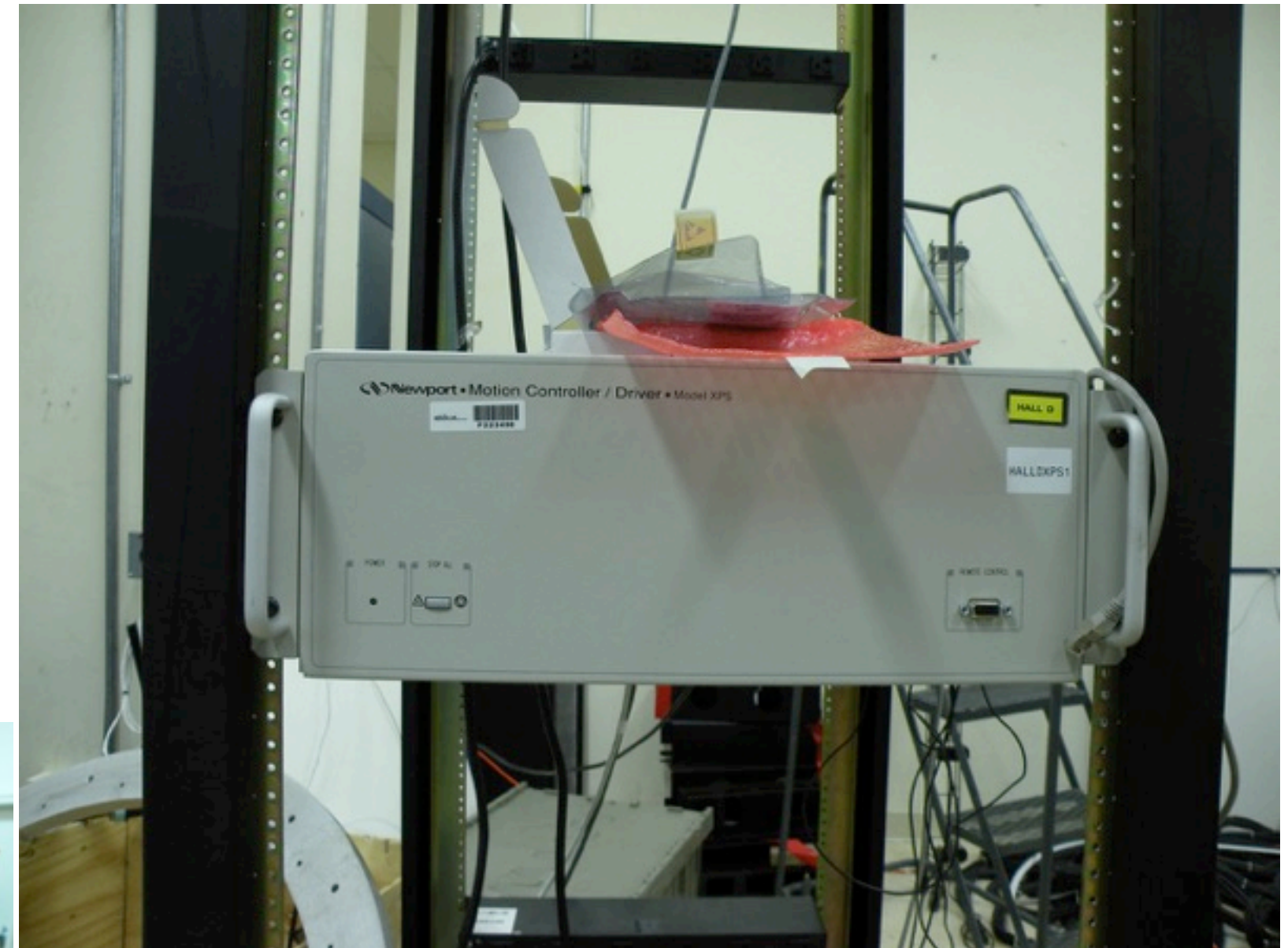
Motor Setup

- With Hovanes, Scot
- Problems on Thursday, Friday :(
- Turns out plate to push switches was not insulated from rest of arm
- Installed nylon screws for insulation (Monday)

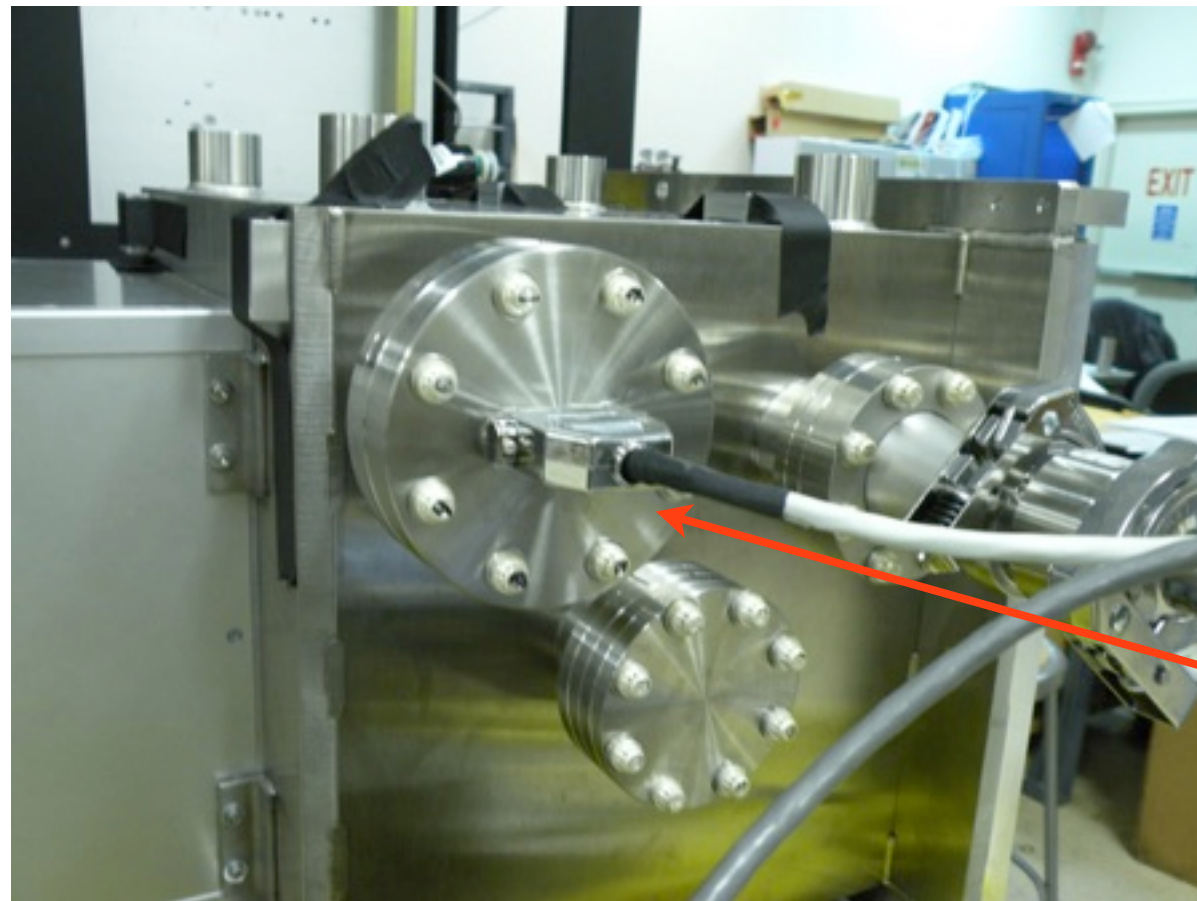


Motor Controls

- Control motor for radiators remotely
- Same setup as in hall
- Hovanes will provide GUI for counting house



motor controller



chamber end

Motor Control Procedure

- Turn controller on (initial beep, then “happy” beep)
- Log on to counting house machines (gluonNN, we used gluon31)
- From outside JLab requires ssh'ing to login.jlab.org → hallgw (need key fob) → gluon31
- Open terminal, type `firefox -no-remote -ProfileManager`
- Go to `halldxps1.jlab.org`

Motor Control Procedure

- Log in as Administrator
- All controls we use are in Move tab
- “Initialize” will power on motor
- “Home” will set motor to pre-programmed home position (sets to 0)
- Abs move will move motor to positions in coordinate system

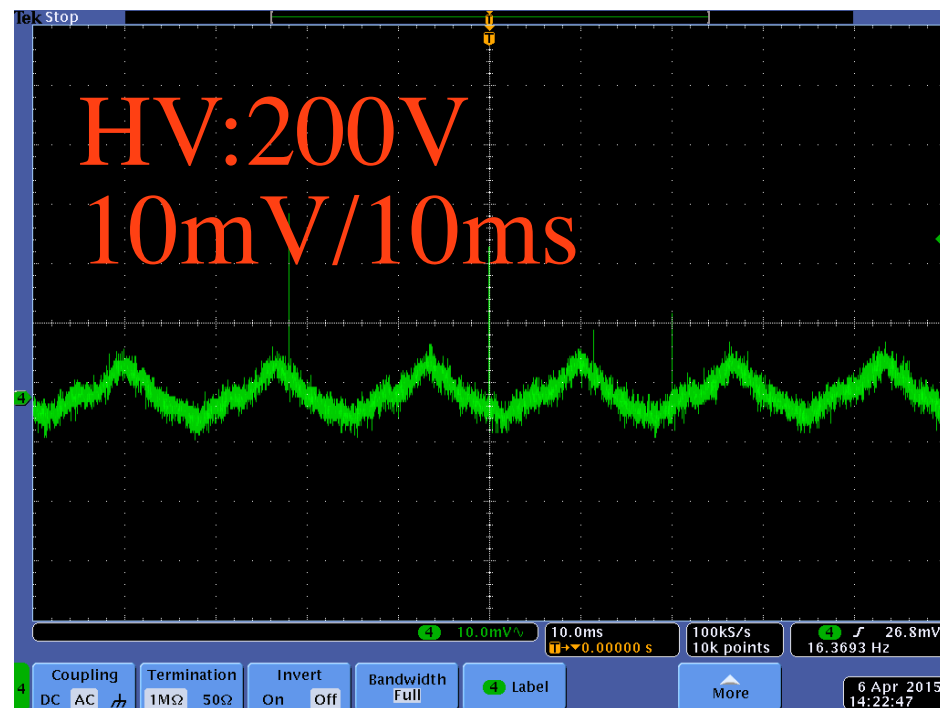
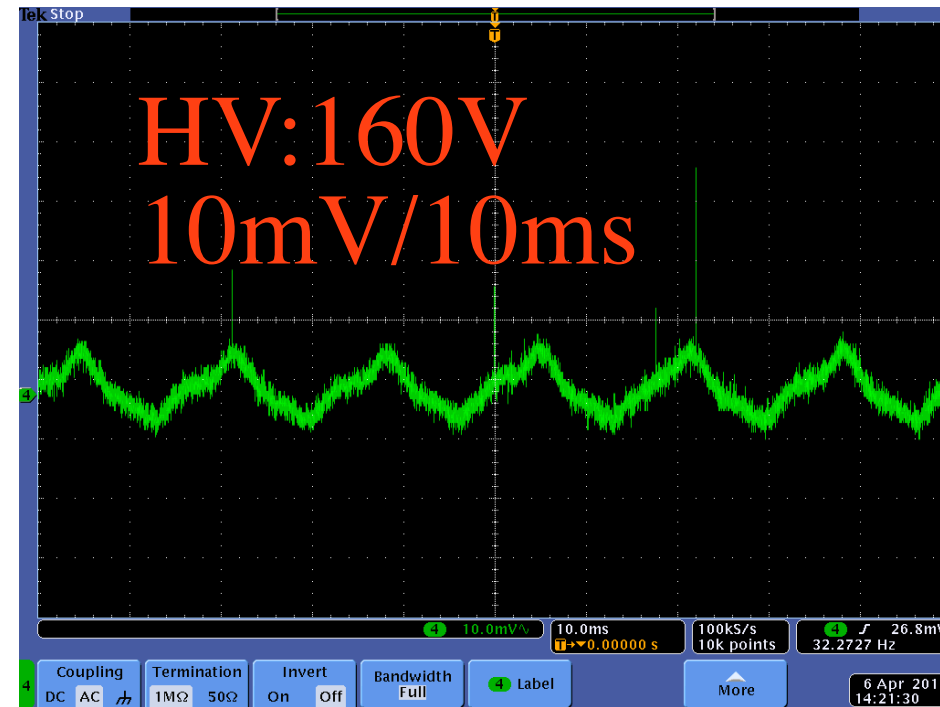
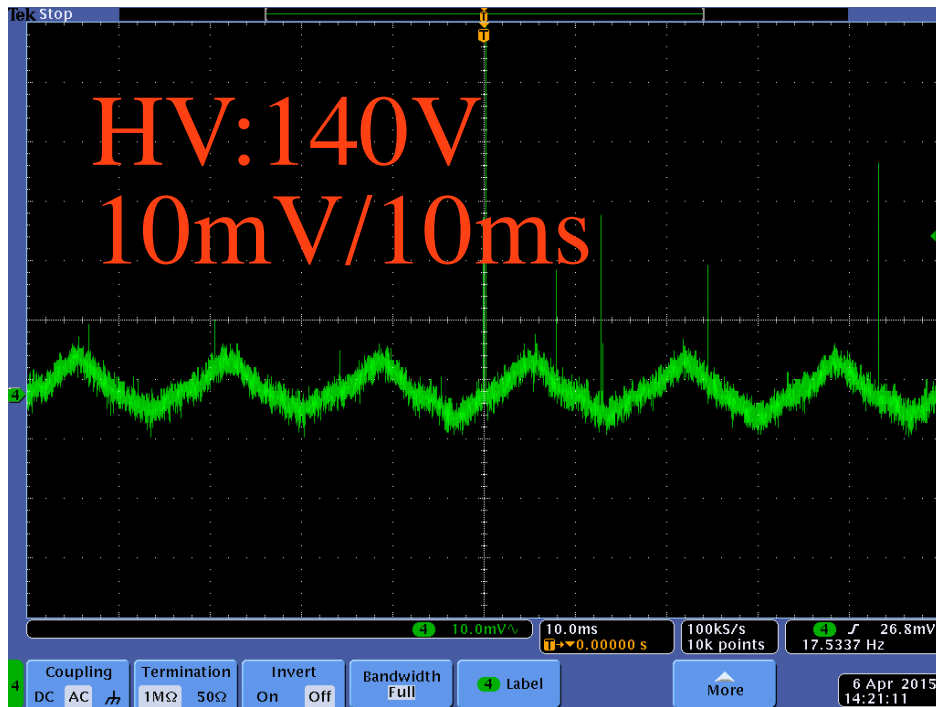
current position

disables motor

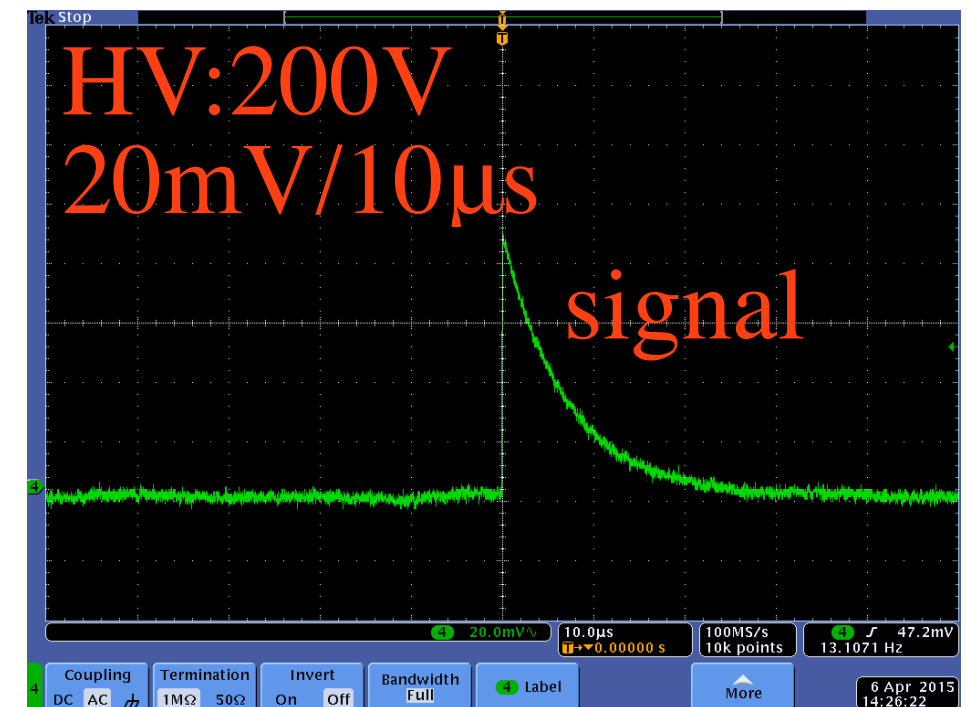
kill all switch (set to uninitialized state)

these instructions will be obsolete once we have GUI controls from Hovanes

Noise Levels with ^{90}Sr

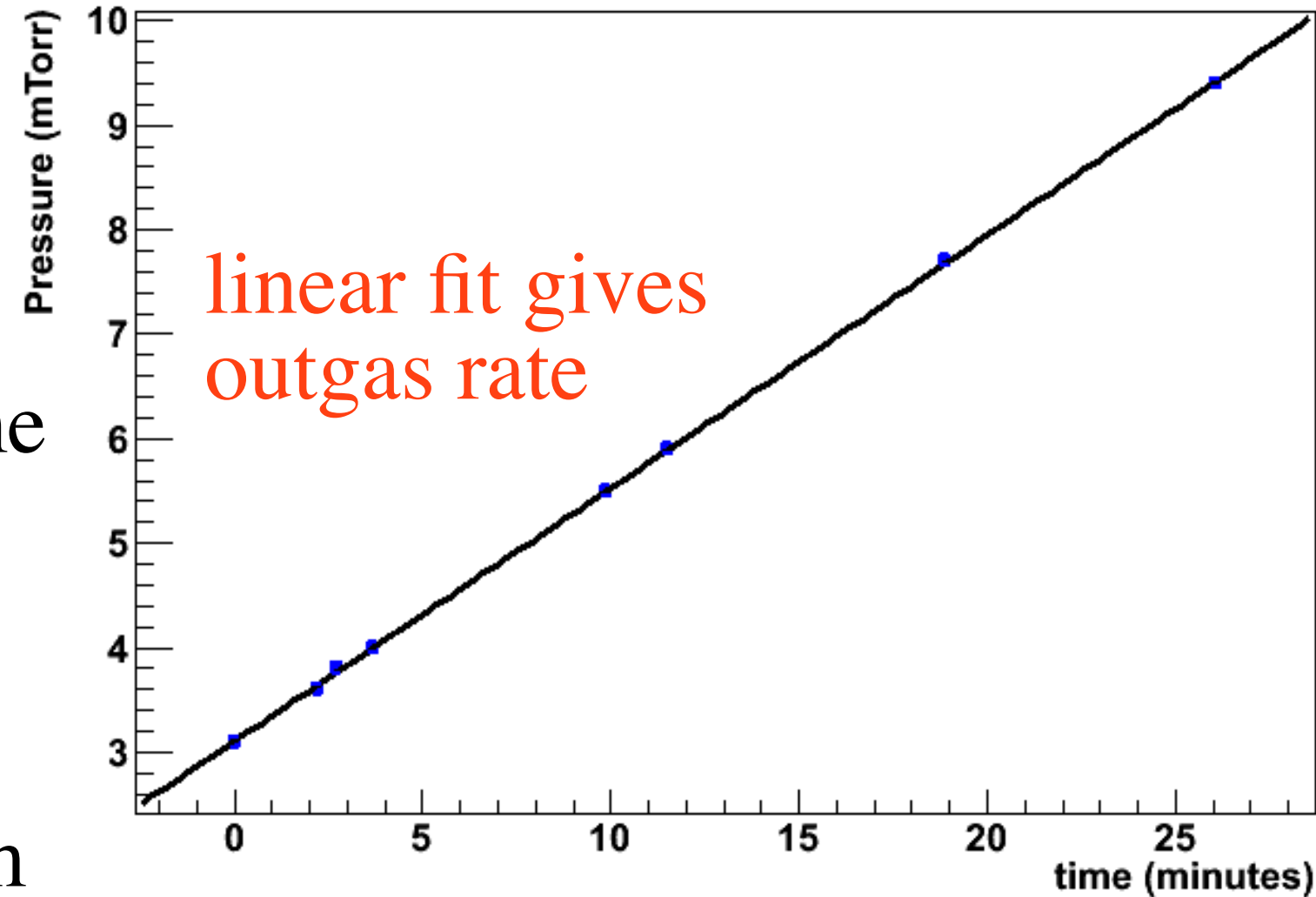


Did not see change in noise levels when motor was turned on



Outgas Tests With Motor

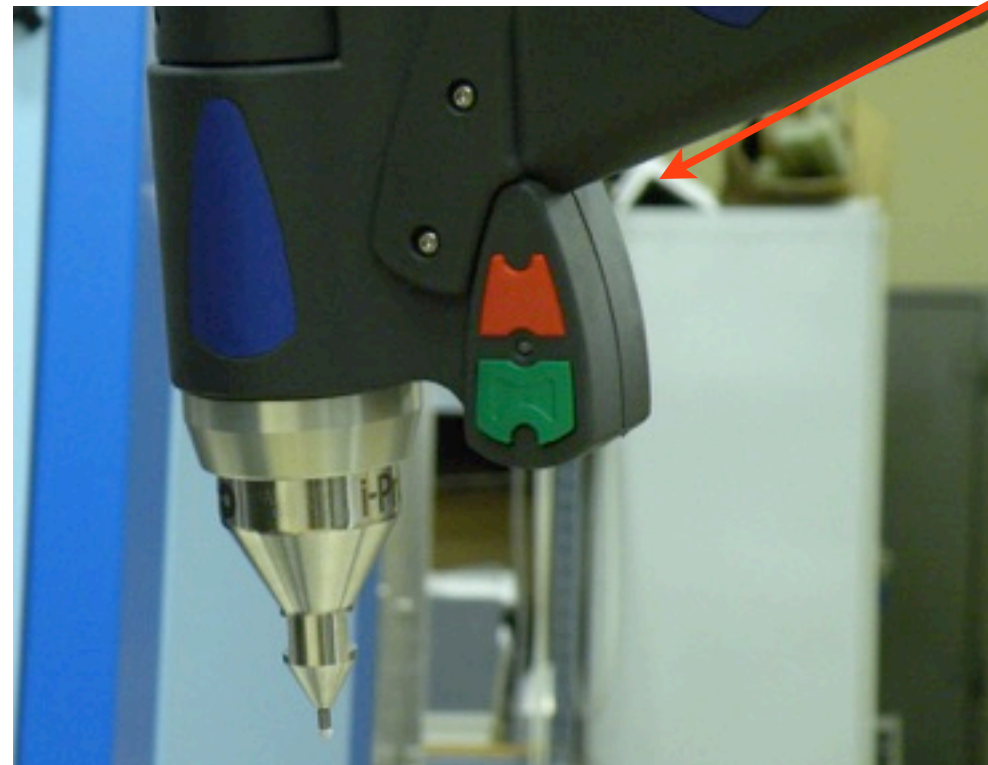
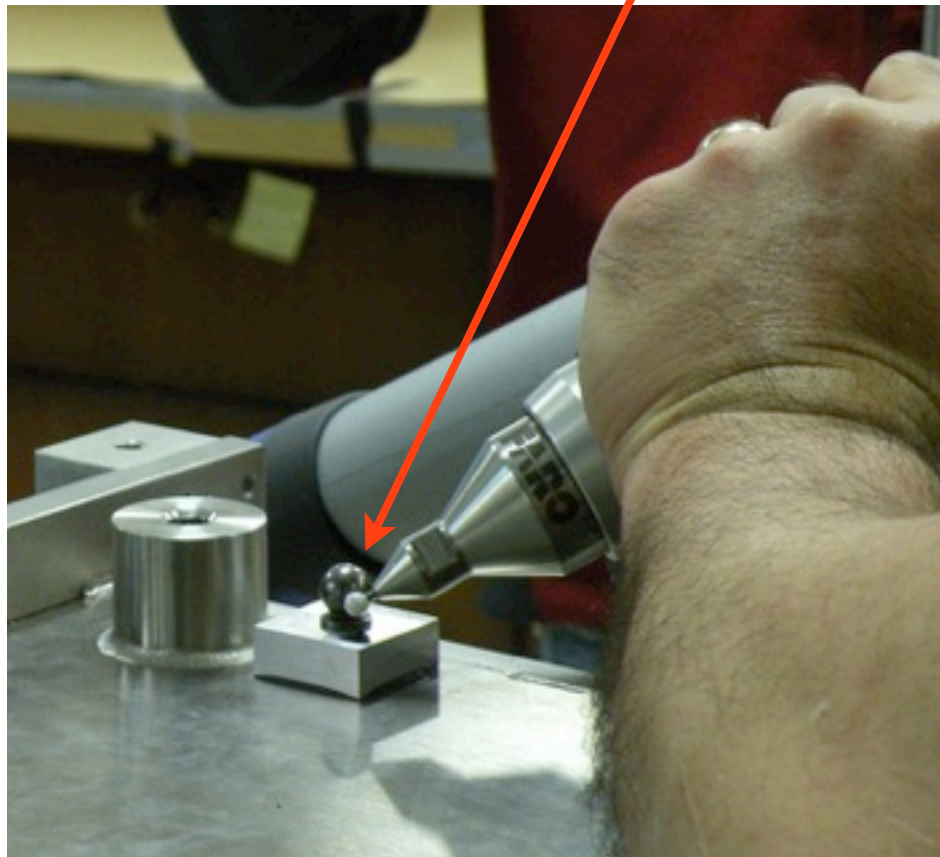
- After pump down of 16 hours
- Outgas rate $dP/dt = 0.242$ mTorr/min
- Define $Q_0 = V (dP/dt)$, V : chamber volume
- Define $Q_u = (dV/dt) P_u$, P_u : ultimate pressure
- Want $Q_u > 10 Q_0$ to ensure secure vacuum
- Numeric values using $V = 29.5$ liters, $(dV/dt) = 100$ liter/s, $P_u = 2 \times 10^{-5}$ Torr gives $Q_u = 2 \times 10^{-3}$ Torr liter/s $> 10 \times Q_0 = 10 \times (1.19 \times 10^{-4})$



vacuum should be secure

Survey

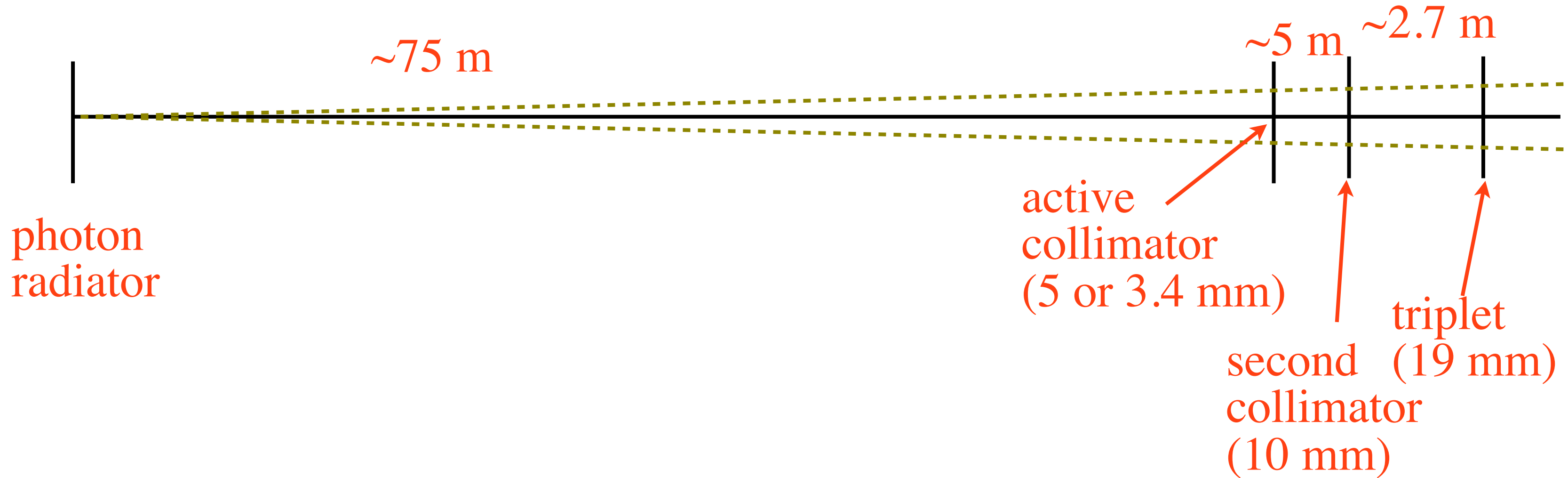
- Meeting on Monday, survey on Tuesday
- Survey machine will use references to set up coordinate system
- Does fits to determine position of objects of known shape???



Survey Results

- 500 motor steps measured to be 86.18 mm → step size is 0.17236 mm
- Position of radiators are calibrated, and will be hardcoded by Hovanes in mm into our controls
- Our alignment seemed fine except:
 - detector was 0.14 mm lower, 1.37 mm more towards door than designed
 - converter tray is 2.1 mm low compared to detector center (2.4 mm low at far end and 1.8 mm low at end near door) - should not be a problem
 - Converter tray openings are 3/4 inch (19 mm). First collimator is 5mm (3.4 mm nominal size), second collimator is 10 mm - should not be a problem

Photon Beam Collimation



Even with 5 mm collimator, beam size at triplet should only be 5.5 mm

Survey Results

- The mechanical group has enough play in the beam pipe that they can center the detector on the beam line.
- The distance from the center of the converter tray (in z) is 35.4 mm away from the downstream face of the FR4 and detector. The detector is 1 mm and nearly flush with the face of FR4 → We are about 34.9 mm from center of detector to center of converters (in z). Design was 35 mm. BUT there is some play in the z-direction of converter tray so the precision in the measurement is not as good as all other measurements.

Moving Detector to Hall

- Stripped all connections
- Took out detector
- Removed preamp and distribution box



nothing connected

Moving Detector to Hall

- Detector was moved to hall today, but was installed backwards (!)
- Concrete base destroyed, Tim says will be ready by tomorrow afternoon



beam position adjusting flange



OUTLOOK

- Waiting for Alex (Sasha) Somov for fADC self-triggering, setup. He should get this done soon, and we can probably do source tests in the hall with fADC readout.
- Need to reconnect all connections, test signals
- Install Be foils