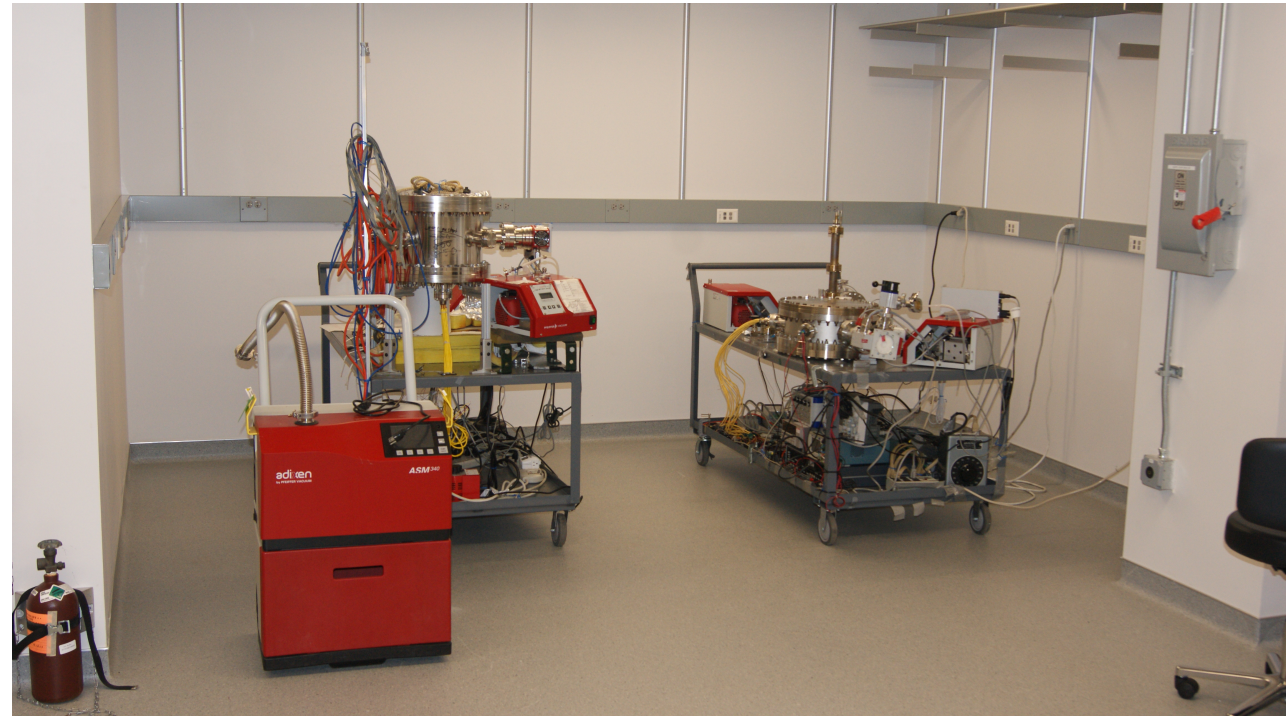


Problems solved and problems not-solved since the last GP review

Evan Angelico



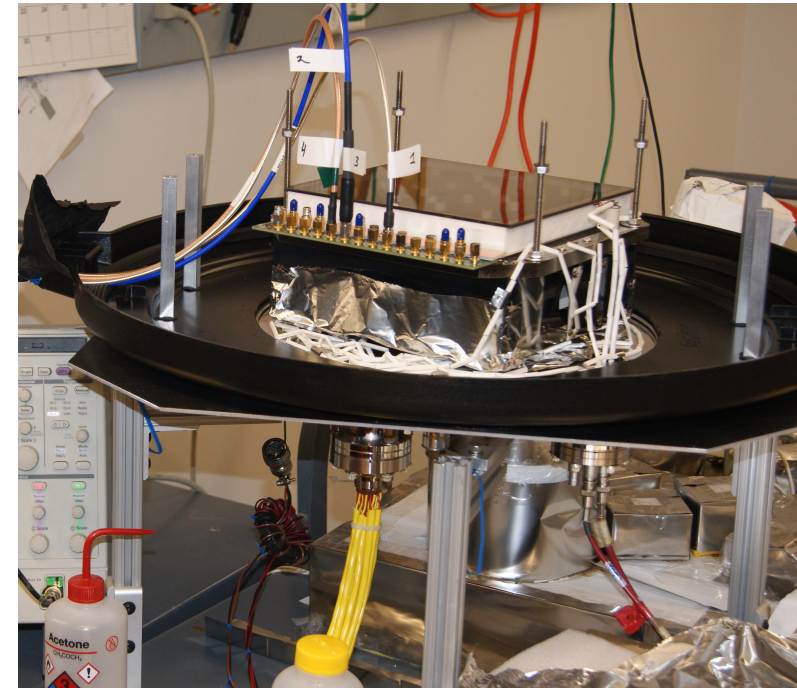
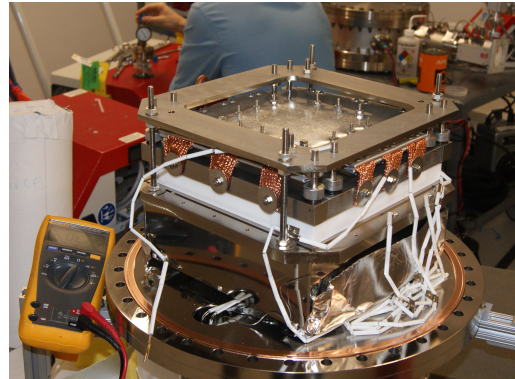
Improvements to procedure and facility upgrades



Overhead crane!

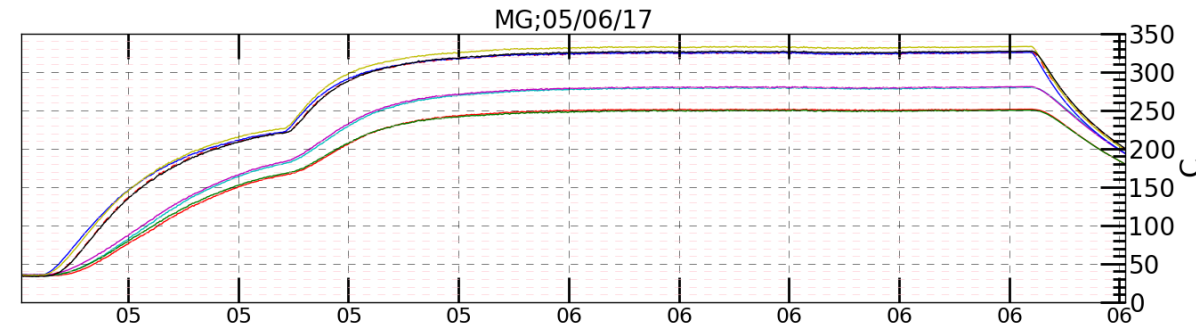
Improvements in procedure and facility upgrades

- Serious facility upgrade
 - Sinks, wet lab, fume hood, clean areas
 - Overhead crane
 - Margherita 4pi access, organization
 - Clean power
 - Regular mopping
- Two Margherita facilities
 - Full side access to LAPPDs in fab.
 - Double tile fabrication throughput

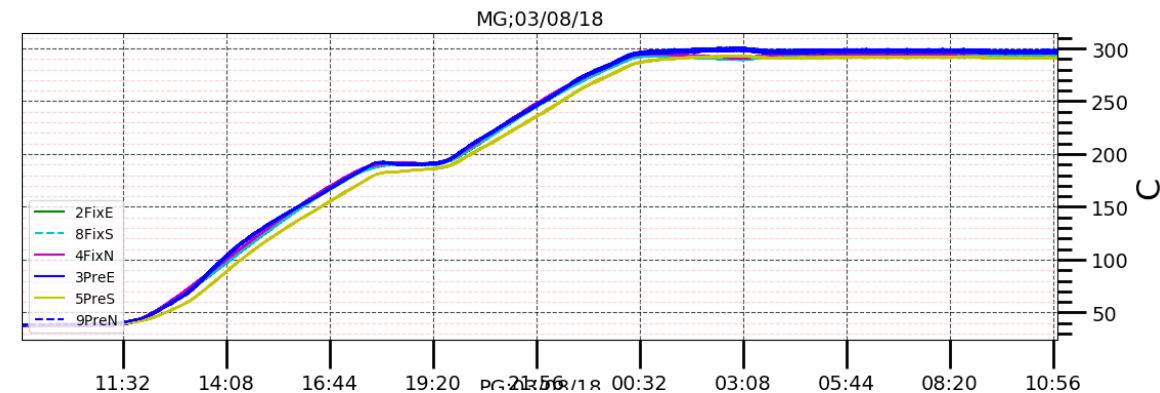


Improvements in procedure and facility upgrades

- In house Indium etching
- In house MCP baking
- <1 mil precision on stack height
- Quartz-tungsten lamps → NiCr heaters

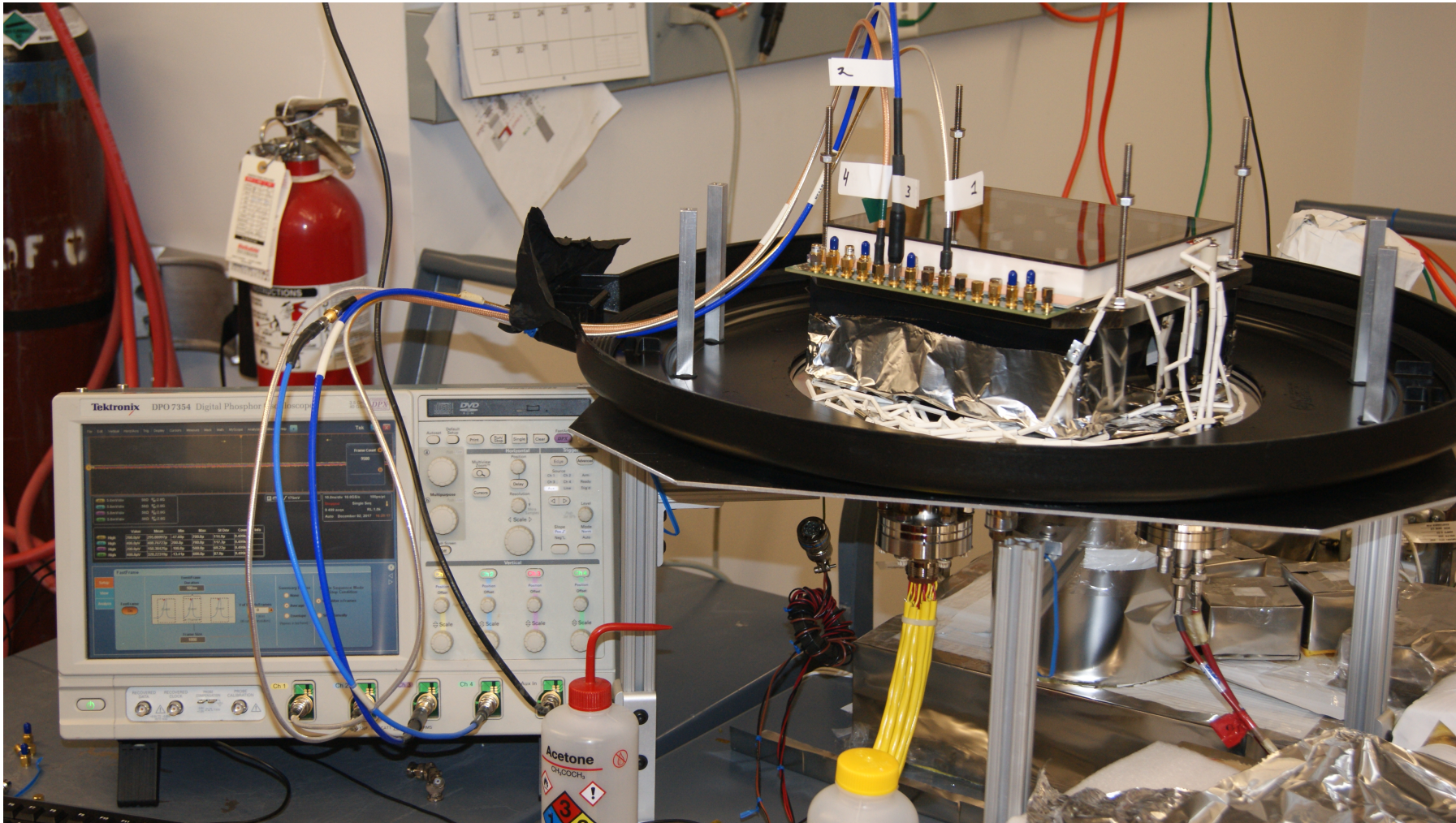


- Thermal uniformity of the LAPPD in production
 - Insulation and heater design a-la Eric
 - ~5 degree C spread between window and ba
 - Indium is uniform to 5C



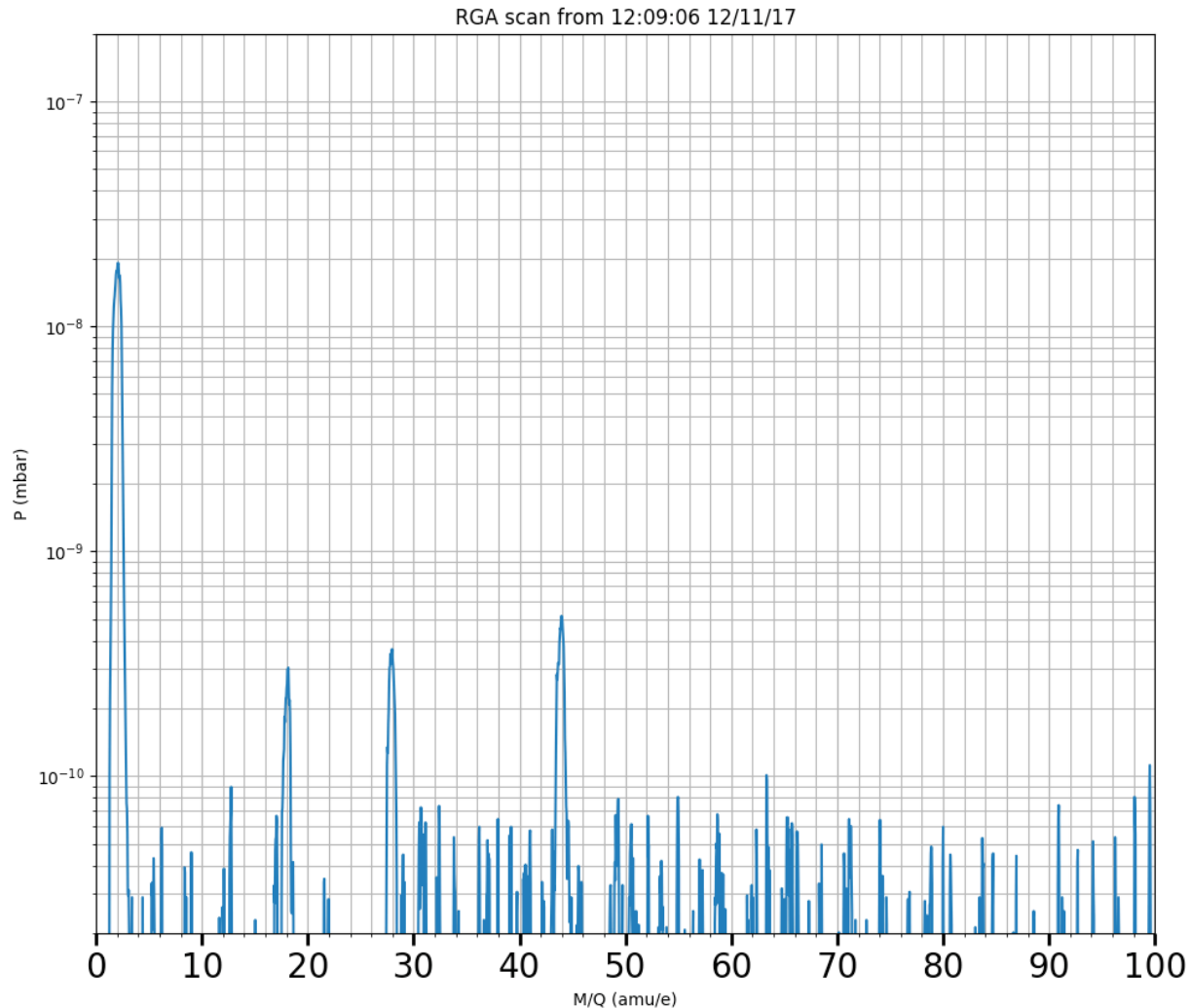
Improvements in procedure and facility upgrades

- In-situ pulse readout with 30 channels

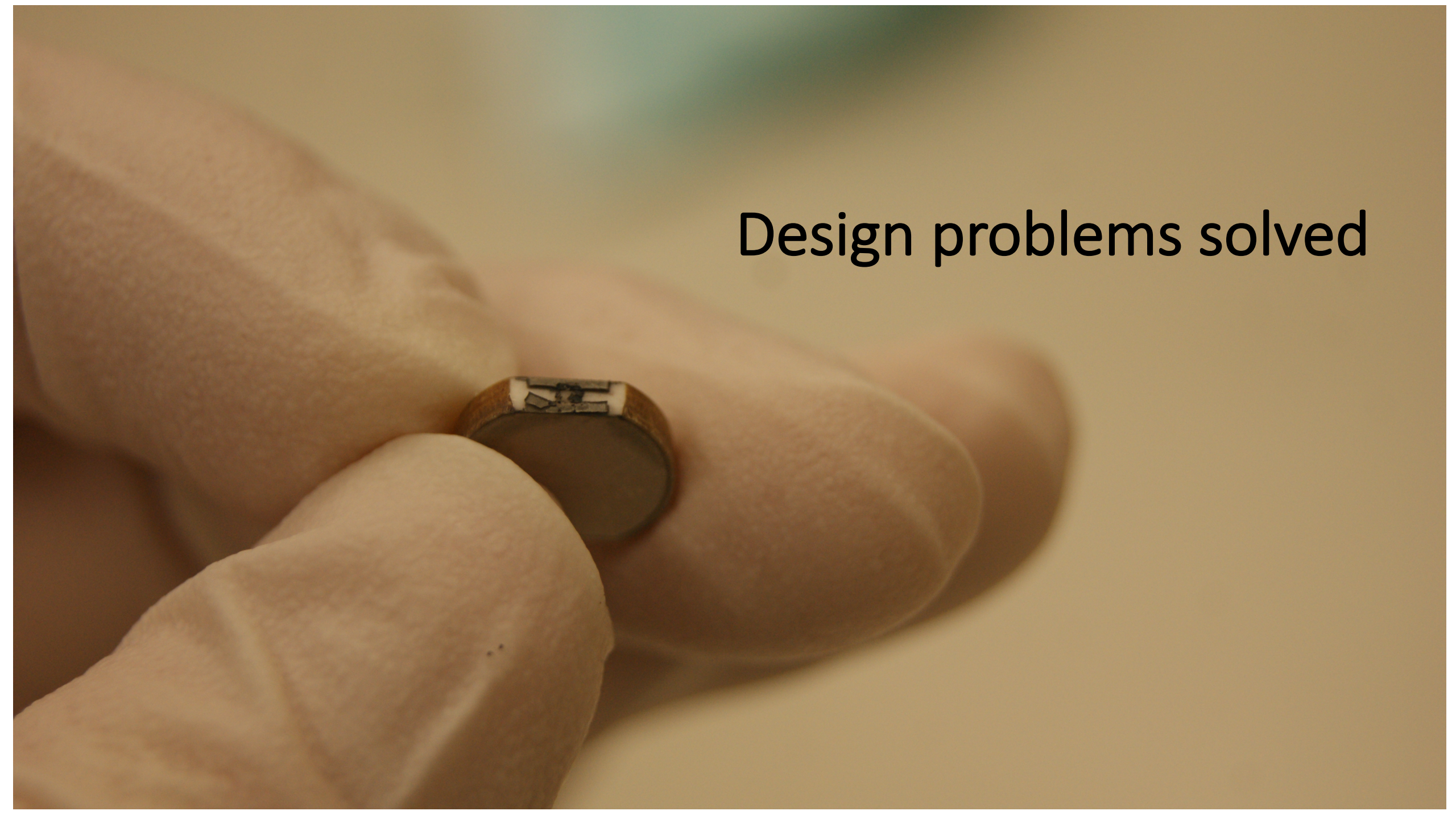


Improvements in procedure and facility upgrades

- Improved cleanliness of Cs manifold and temperature control

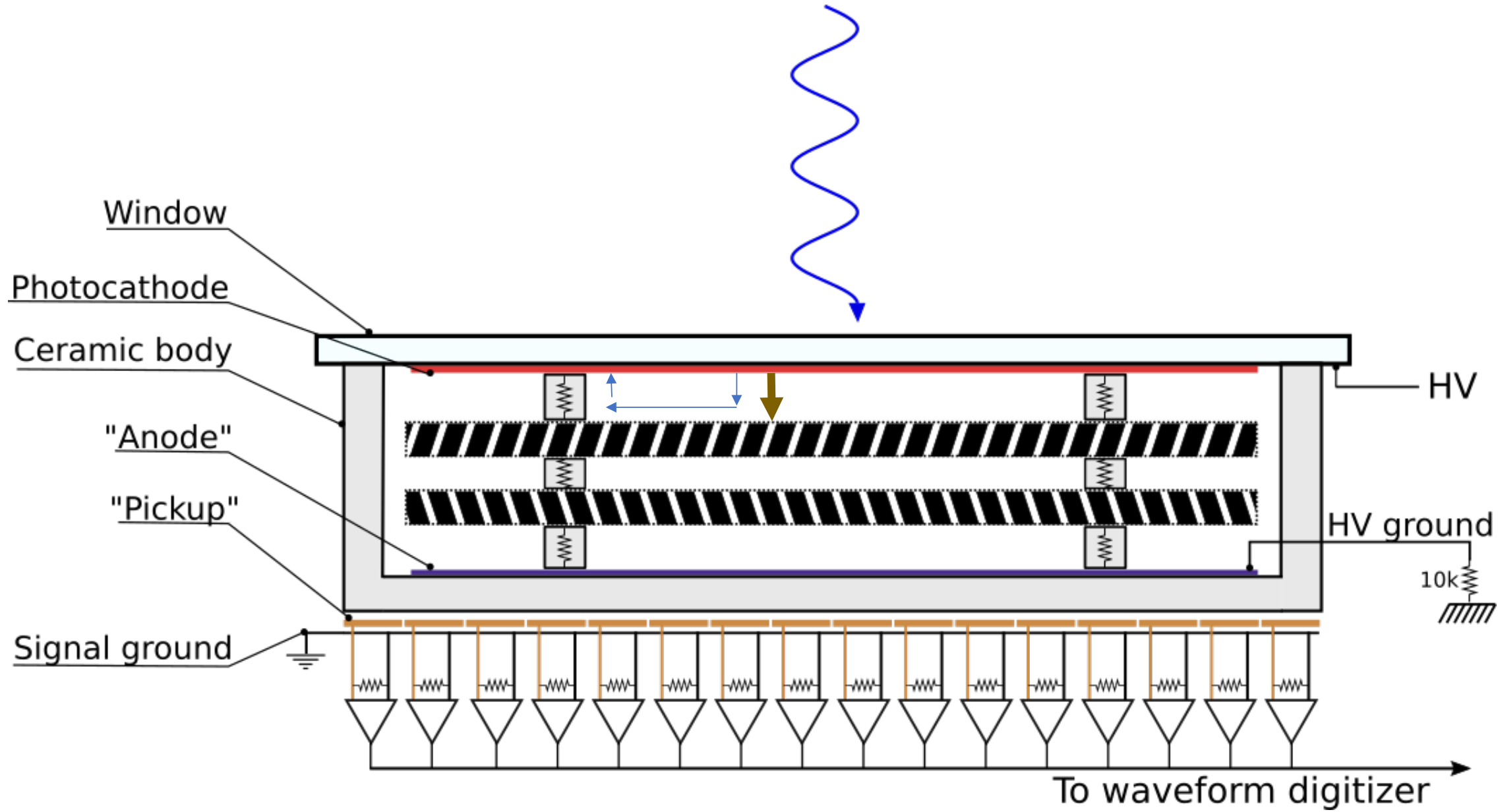


- Manifold pressure is below detection threshold ($2e-9$) at cesiation temperatures
- RGA filament dominates pressure (we now know how to degas it effectively)
- More in session 5

A close-up photograph of a hand holding a small, round, metallic object, possibly a coin or a small component, against a blurred background. The hand is positioned in the lower-left quadrant, with the thumb and index finger gripping the object. The object is dark and has a textured surface. The background is a soft, out-of-focus mix of light and dark tones, suggesting an indoor setting with natural light. The overall mood is one of focus and precision.

Design problems solved

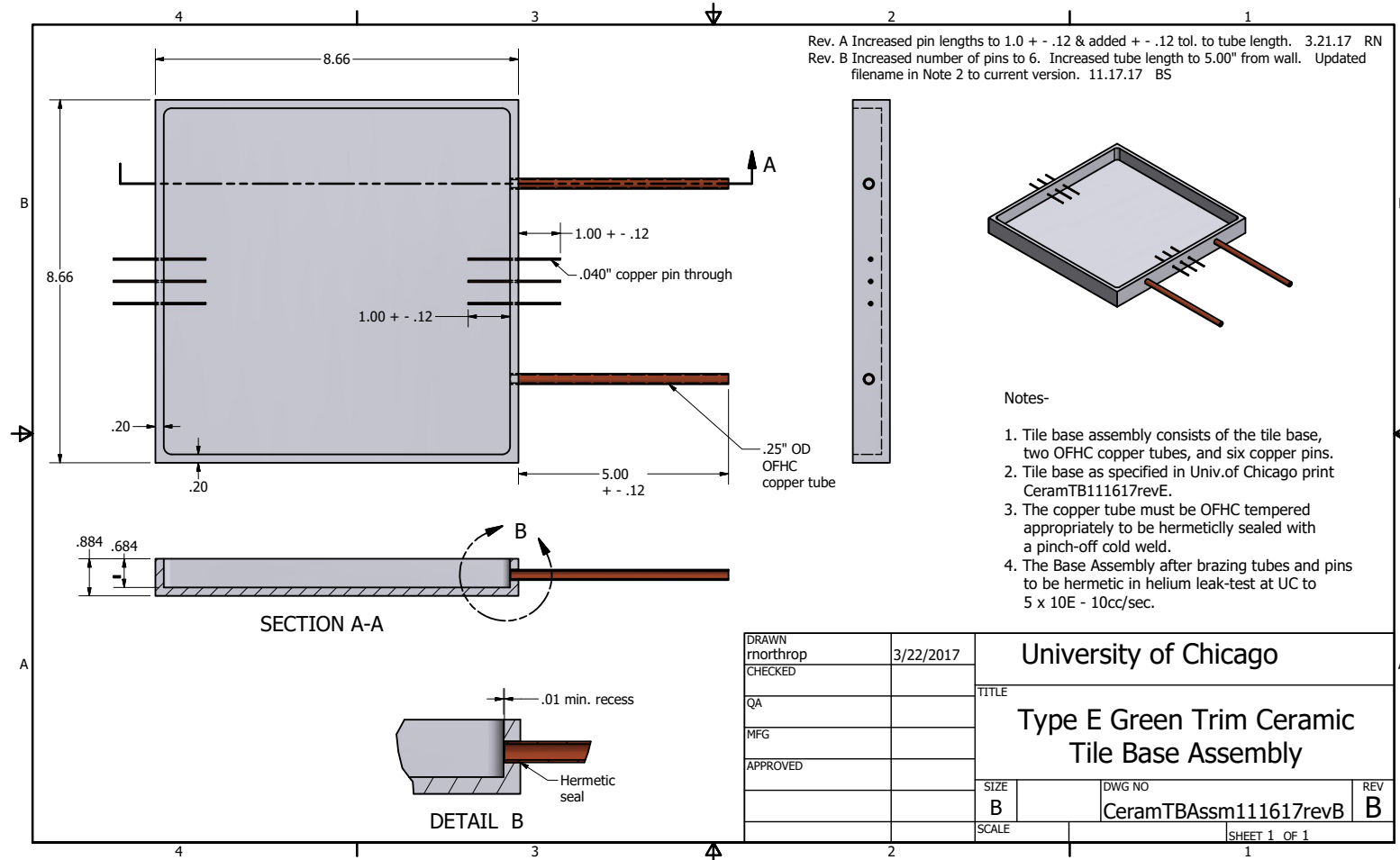




Design problems solved

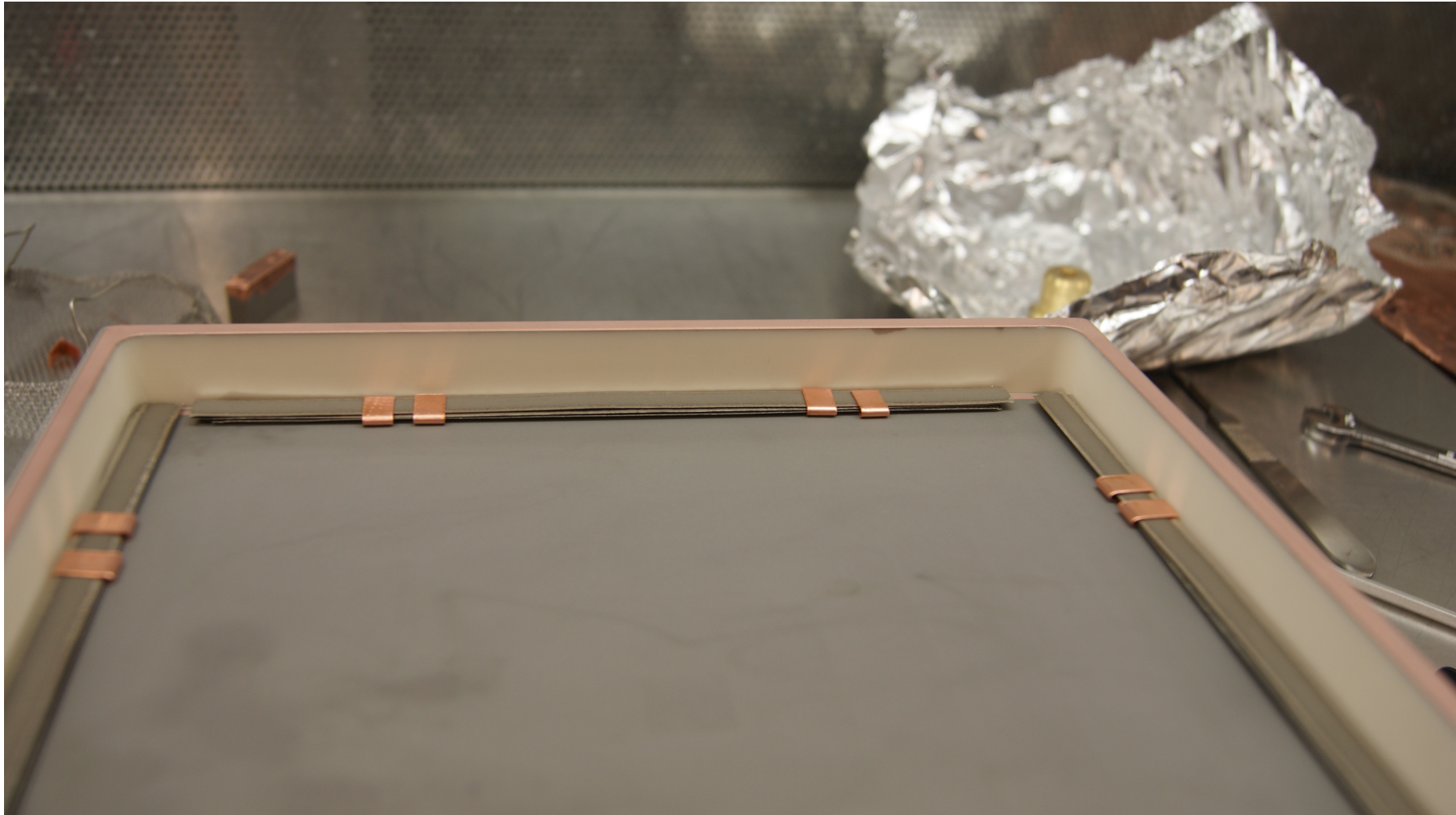
External voltage divider:

- Accurate QE measurement
- Optimize gap voltages for best timing
- Measure isolated MCP resistance during cesiation



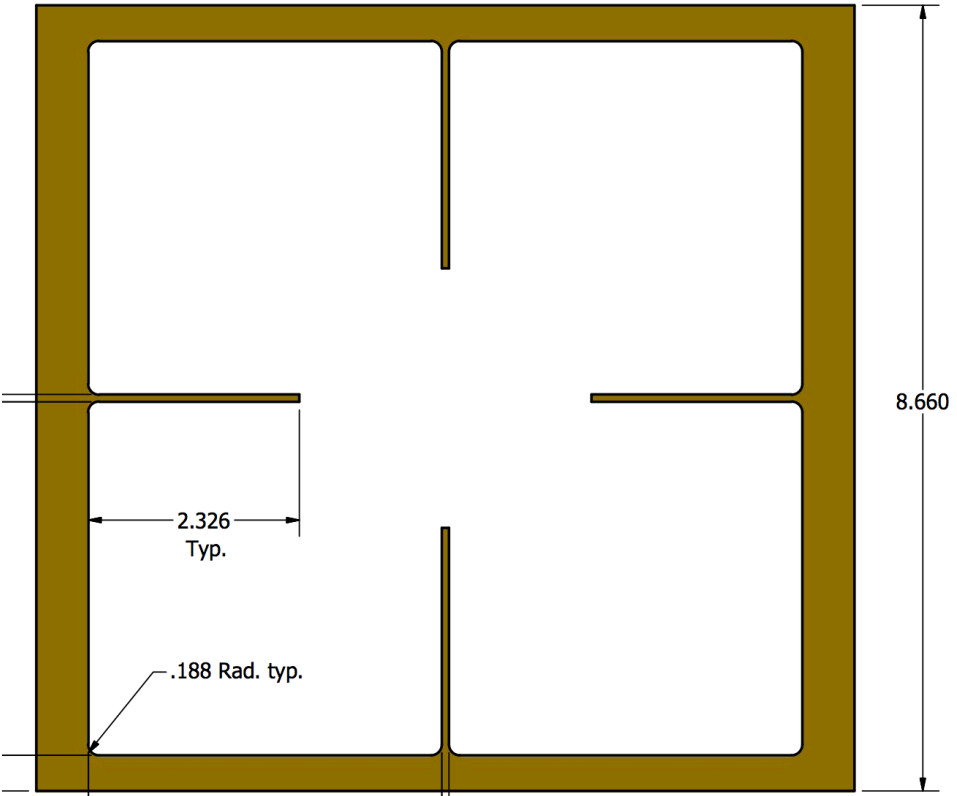
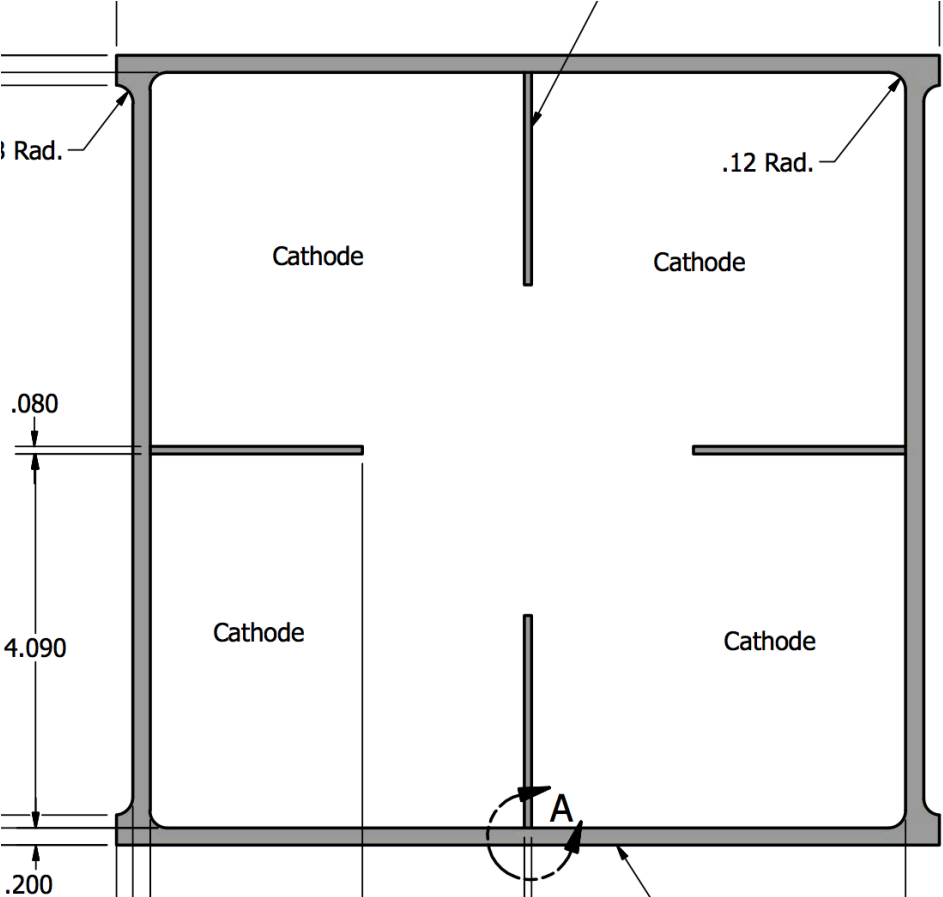
Design problems solved

- Getter mounting, 10g of active material



Design problems solved

- Window metalization change
 - Indium wicking, loss of indium mass
 - Indium-Cesium mixture makes powder

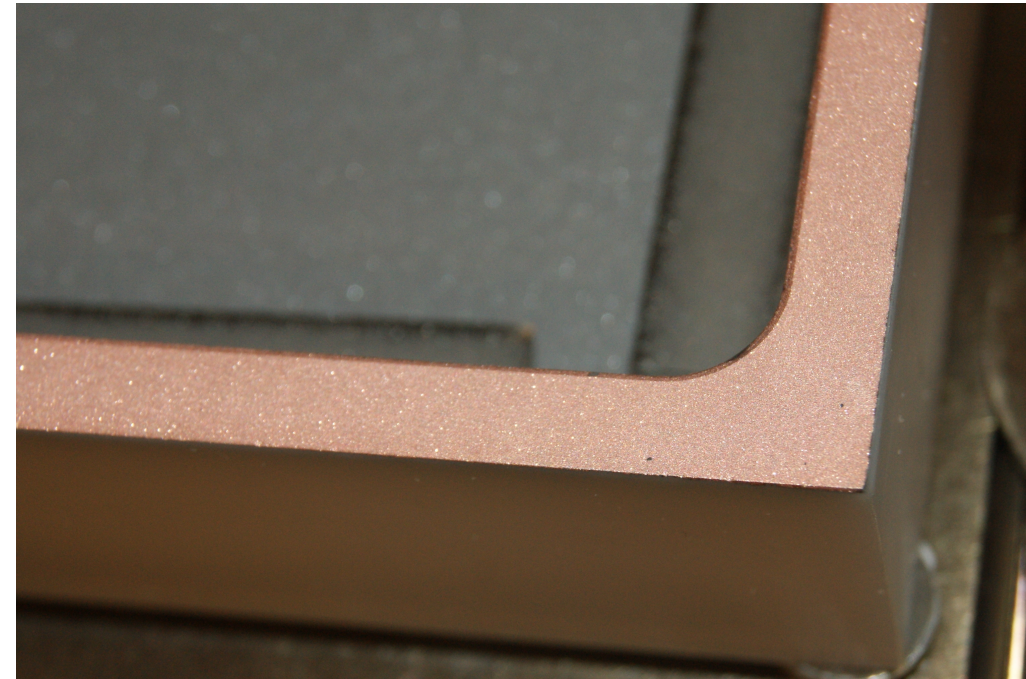


the tile, in crevices and on the window. It was colored on the window, and flaked

Design problems solved

- Metalizing vendors
 - PURE metals

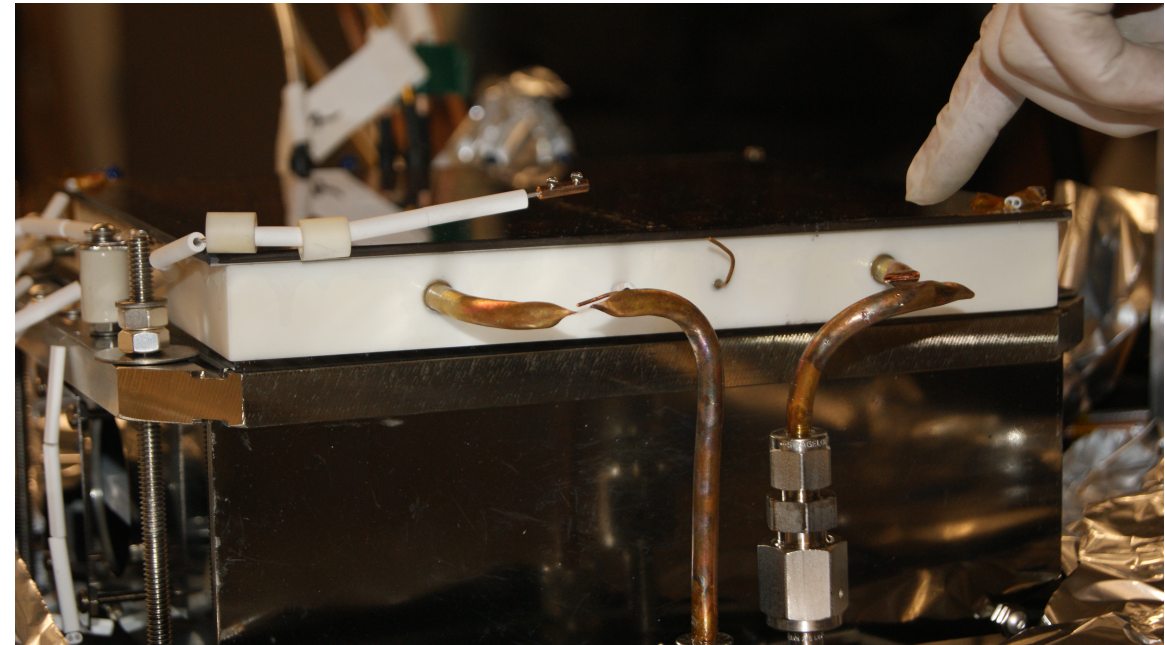
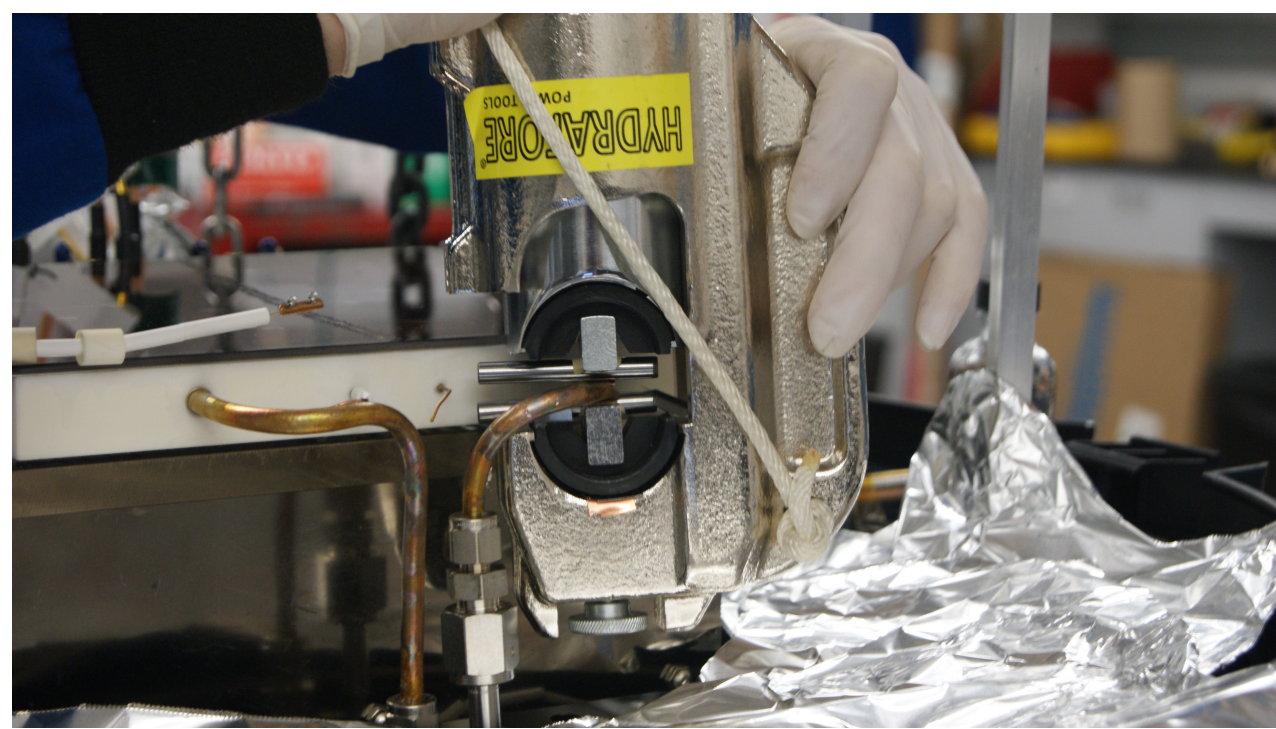
- Evaluating 4 ceramic vendors



Design problems solved

- Copper tube pinch-off

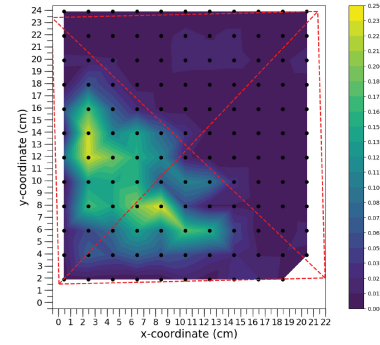
New tool to try out next time



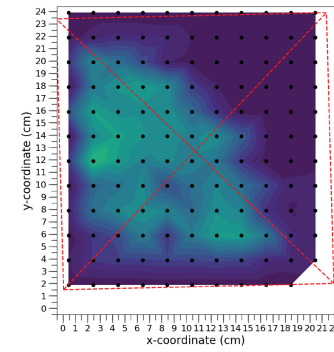
Tile 21 pulses!

Capacitive pickup, 30 strip-line readout

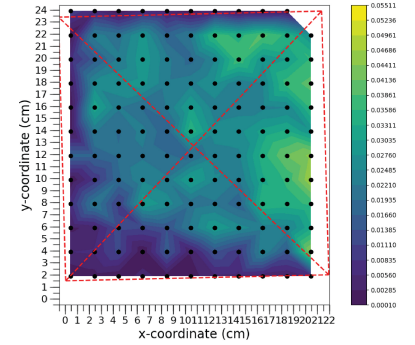
After 24 hours of cesiation



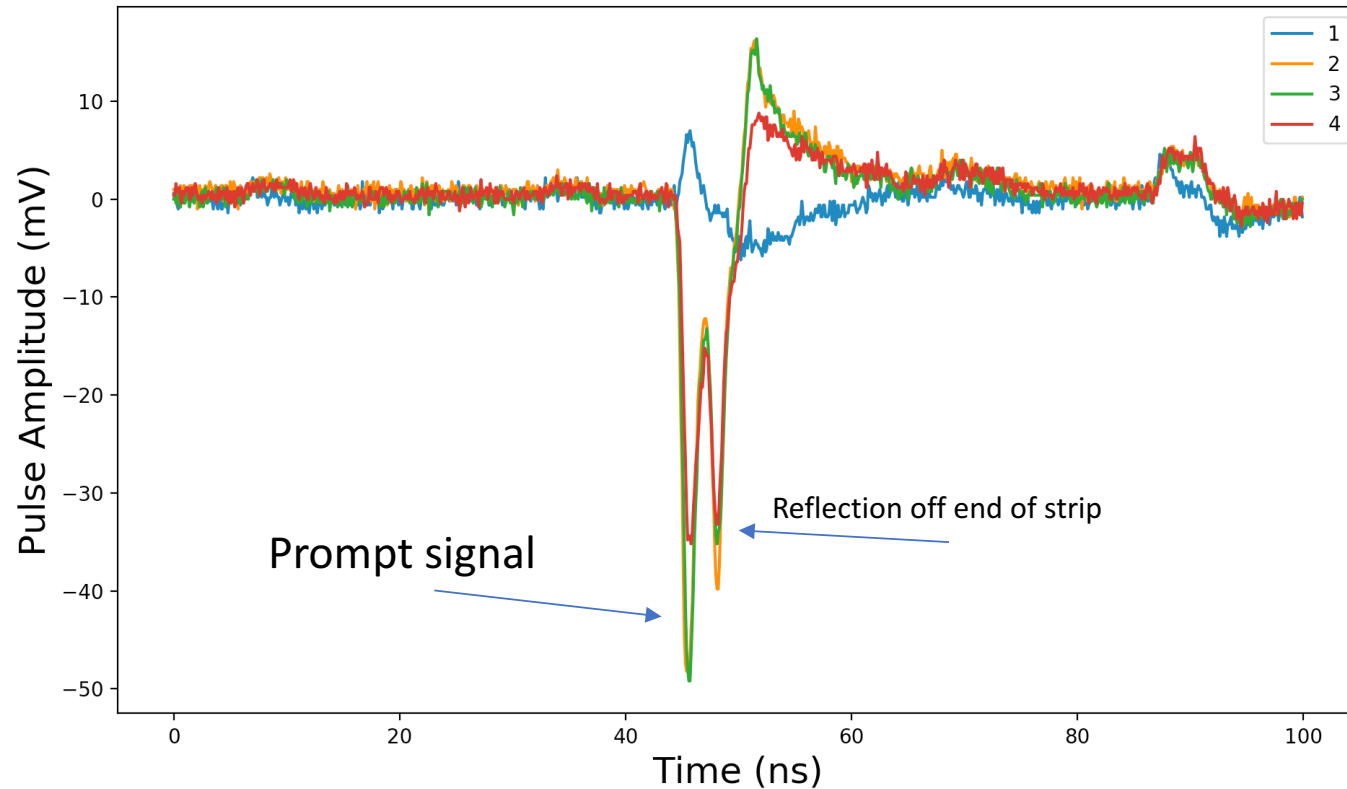
After 48 hours of cesiation



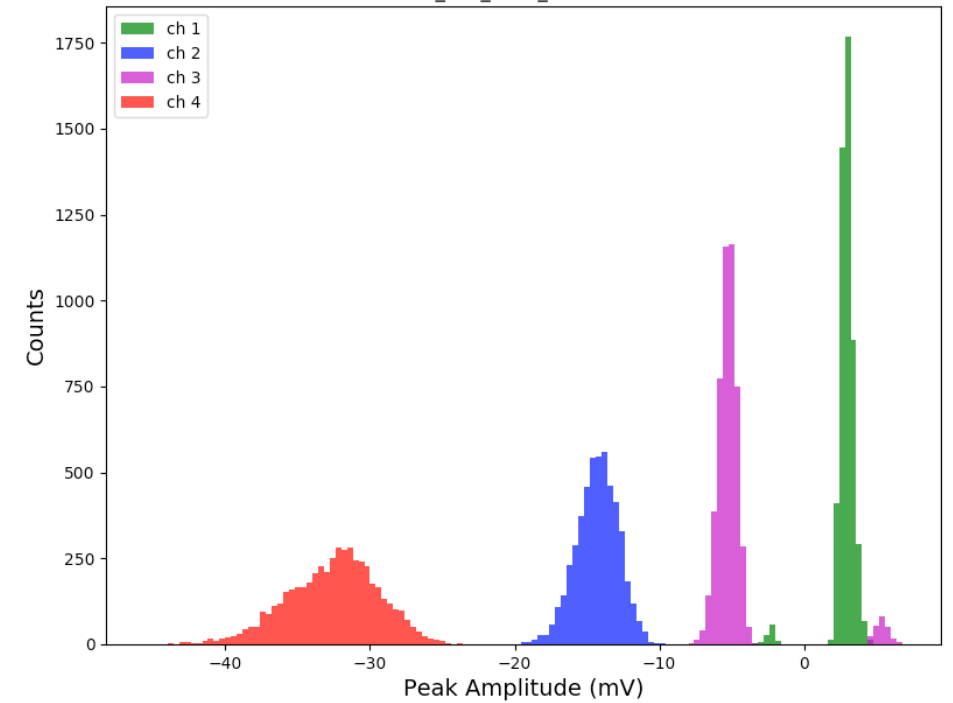
Increase j-tube from 145C-190C, cesiate for 2 hours then close source, and sit for 50 hours



Event number: 418



Phd for pulses in /J.2.9kV_aux_laser_10mVDiv.mat



A close-up photograph of a metal assembly. In the foreground, a rectangular metal component is shown, which appears to be cracked or broken along its top edge. The component has a light-colored, possibly painted or coated, surface. Behind it, a dark, textured metal plate is visible, featuring several circular holes. A prominent feature is a large, silver-colored metal nut or cap screw with a hexagonal head, positioned centrally in the upper half of the frame. The overall scene suggests a mechanical failure or a problem that has not been resolved.

Problems not-solved

Ceramic package seal – we don't have a working recipe

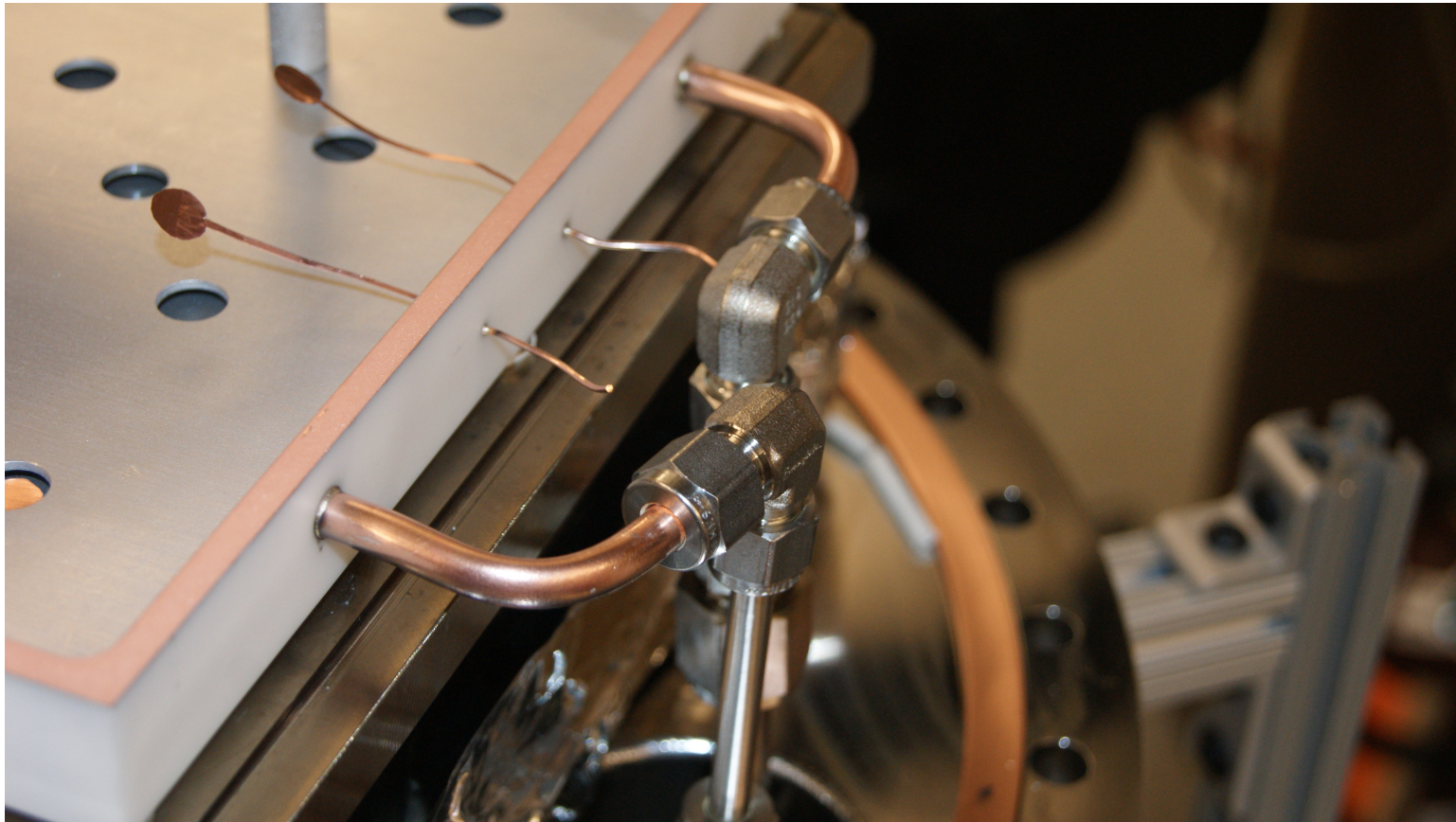
- Tile 14, 16, 17, 18, 20 leaked
- Tile 21, 22, 23, 24...
- Each vendor may have:
 - Different ceramic purity
 - Different grinding/finish/polish
 - Different heat treatment of ceramic
 - Different deposition mechanism
 - Different attention to cleanliness
 - ...

Tile 24 is the most promising:
Friatec-Abrisa-B270 window

Ceramic/ Coating	Aremco	Ice	Coorstek	Friatec
Incom				
Clausing				
Abrisa				

Many combinations to try

~~Leaking brazed tubes and pin feedthroughs~~ →



Tile 24, brazed by Friatec has completely hermetic pins and tubes after heat cycle!

Only one trial though...

Photocathode: (subject of session 5)

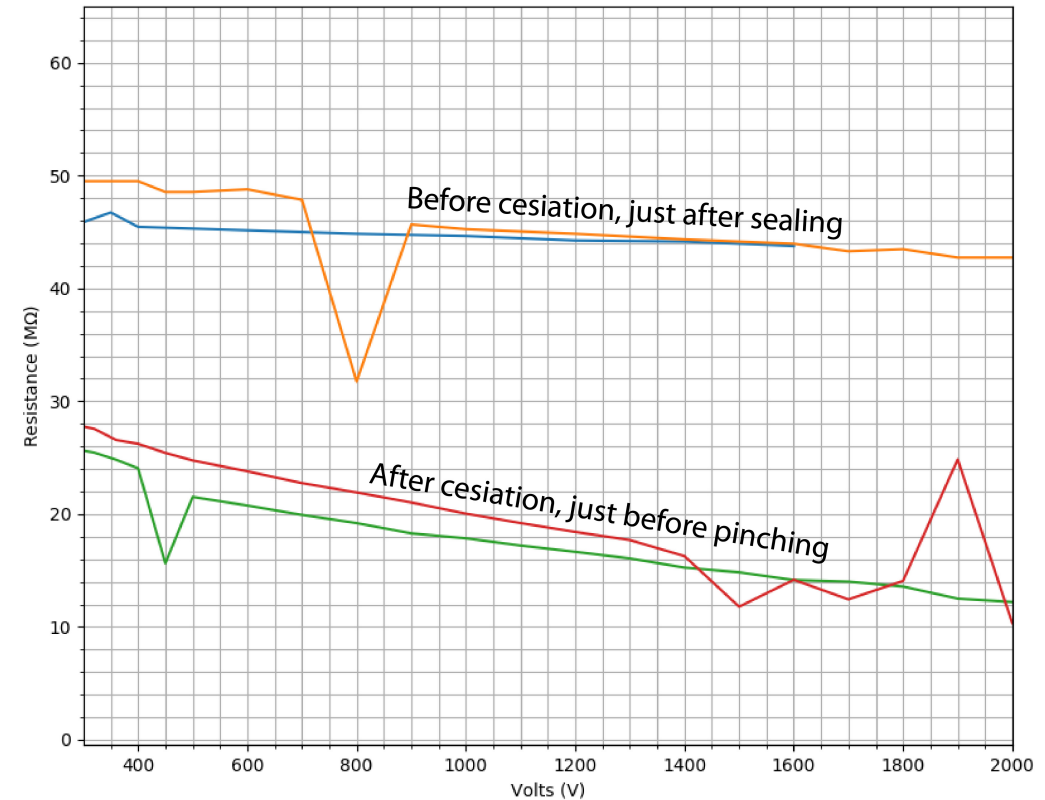
We do not have a proven process to form a Cs-Sb photocathode with QE > 5%

Most recent procedure:

1. Open Cs valve, source at 145C
2. At 50 h, increase the source temperature to 185C
3. Close 2 hours after reaching hotter temperature

Result:

- Photosensitivity everywhere (not uniform, >30%?)
- Reduction in total stack resistance
- BUT, MCPs survive enough to produce high gain pulses on 30 strip-line capacitive readout



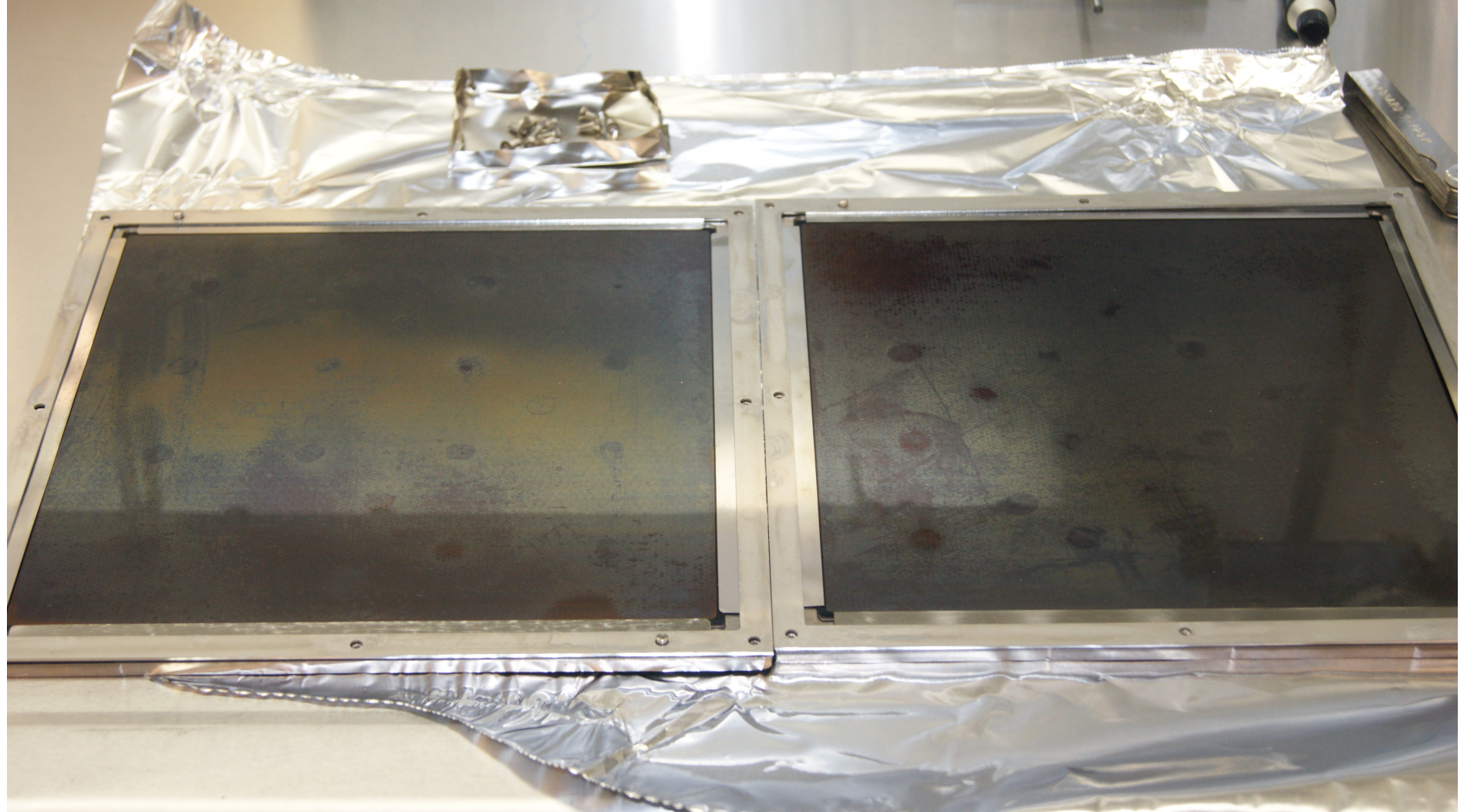
Need a QE measurement, no QE measurement thus far



External voltage divider

MCP production bottle-neck

- Reusing MCPs
- Arradiance



In summary: after various improvements...

- We do not have a proven ceramic package seal recipe
- We do not have a proven process for forming Cs-Sb photocathode with QE > 5%
- There is an MCP production bottle-neck