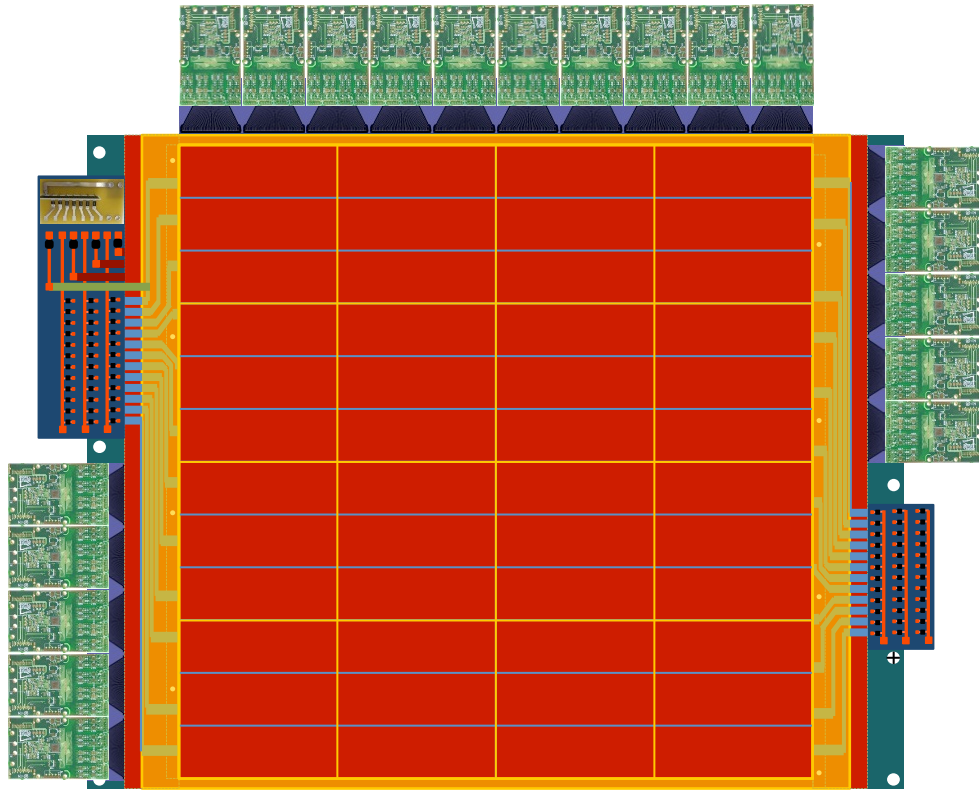


# Uva GEM Chamber Update

Nilanga Liyanage  
University of Virginia

UVa GEM Team

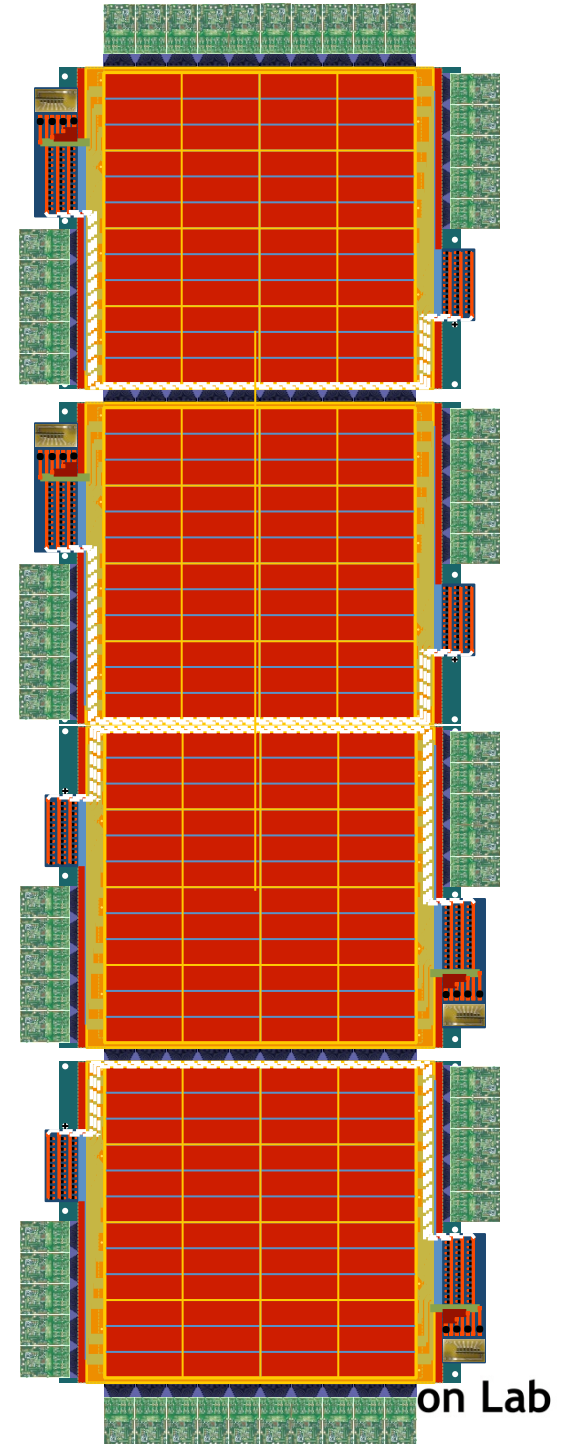
Dr. Kondo Gnanvo, Dr. Vladimir Nelyubin, Kiadtisak  
Saenboonruang, Chao Gu, Xinzhan Bai , Seth Schcher  
With Nikolay Phillip visiting from Tel Aviv



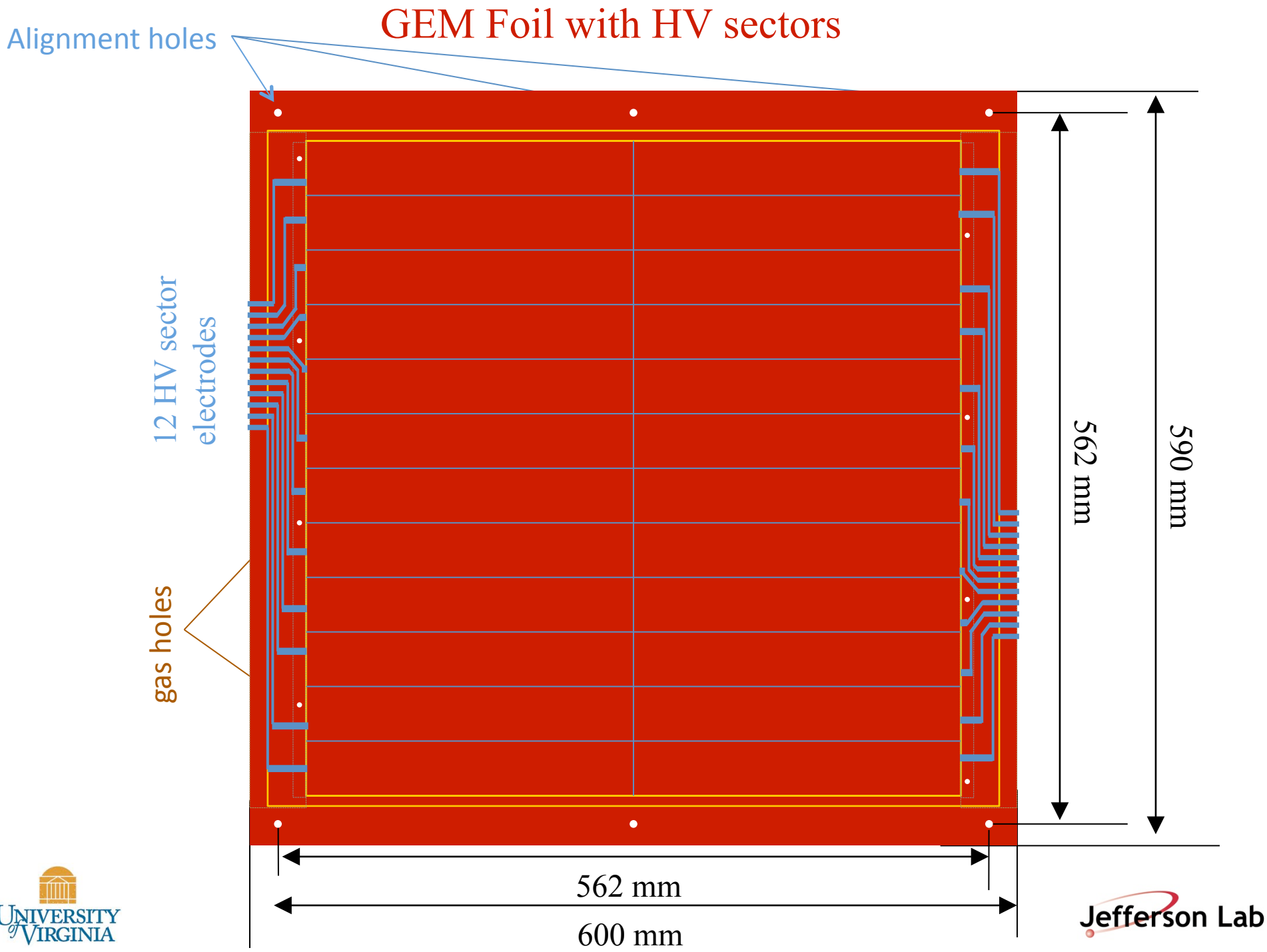
New design for the SBS GEMmodules for polarimeter trackers by Kondo Gnanvo

Need 32 modules + 8 spares

4 GEMs with APV25-  
front end for card  
search of the 8  
Polarimeter chambers

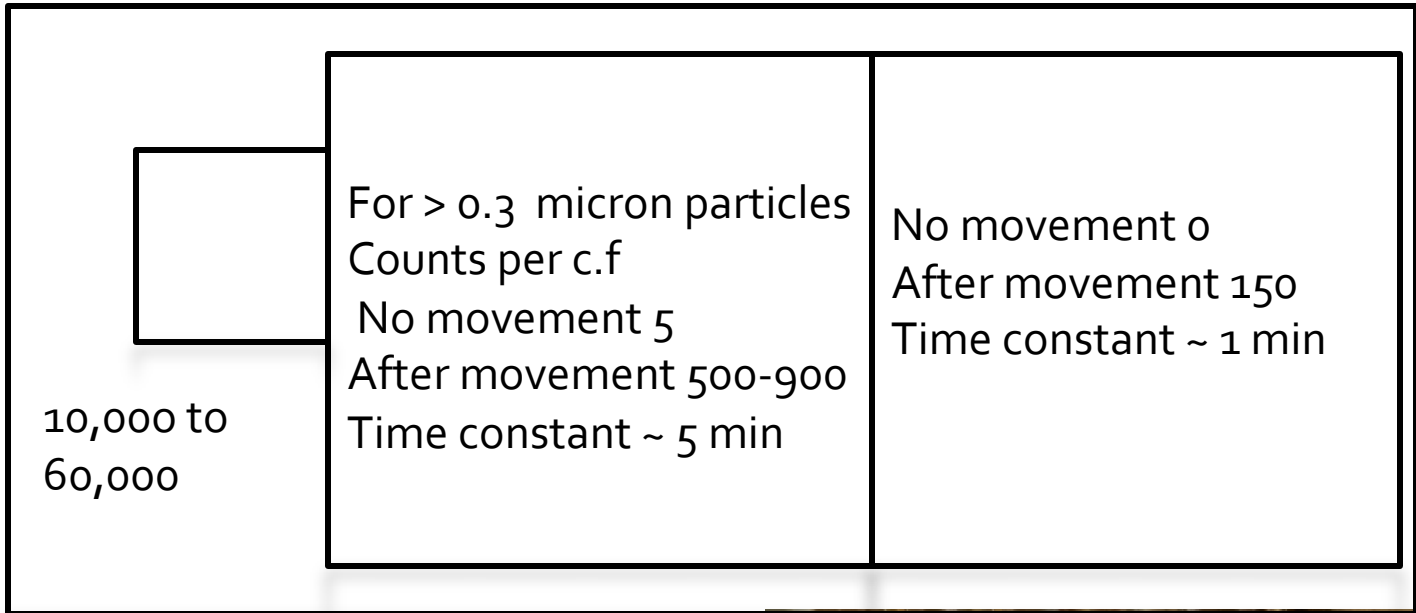




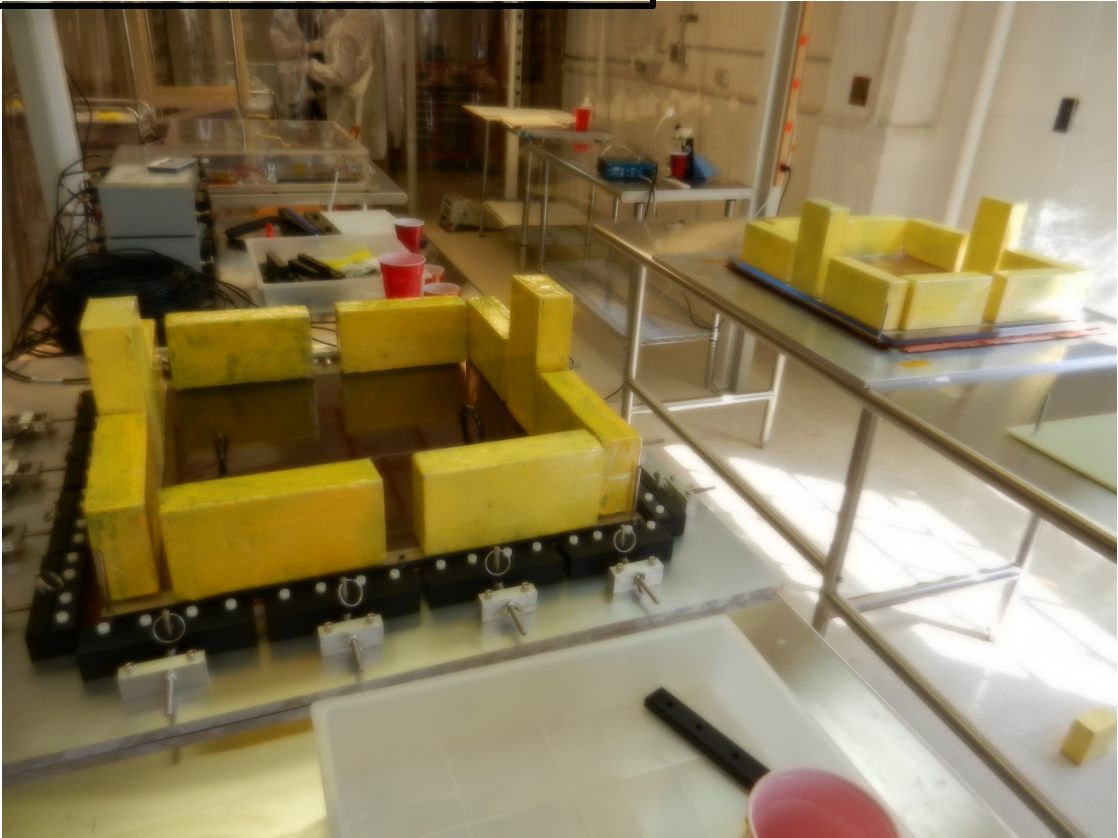


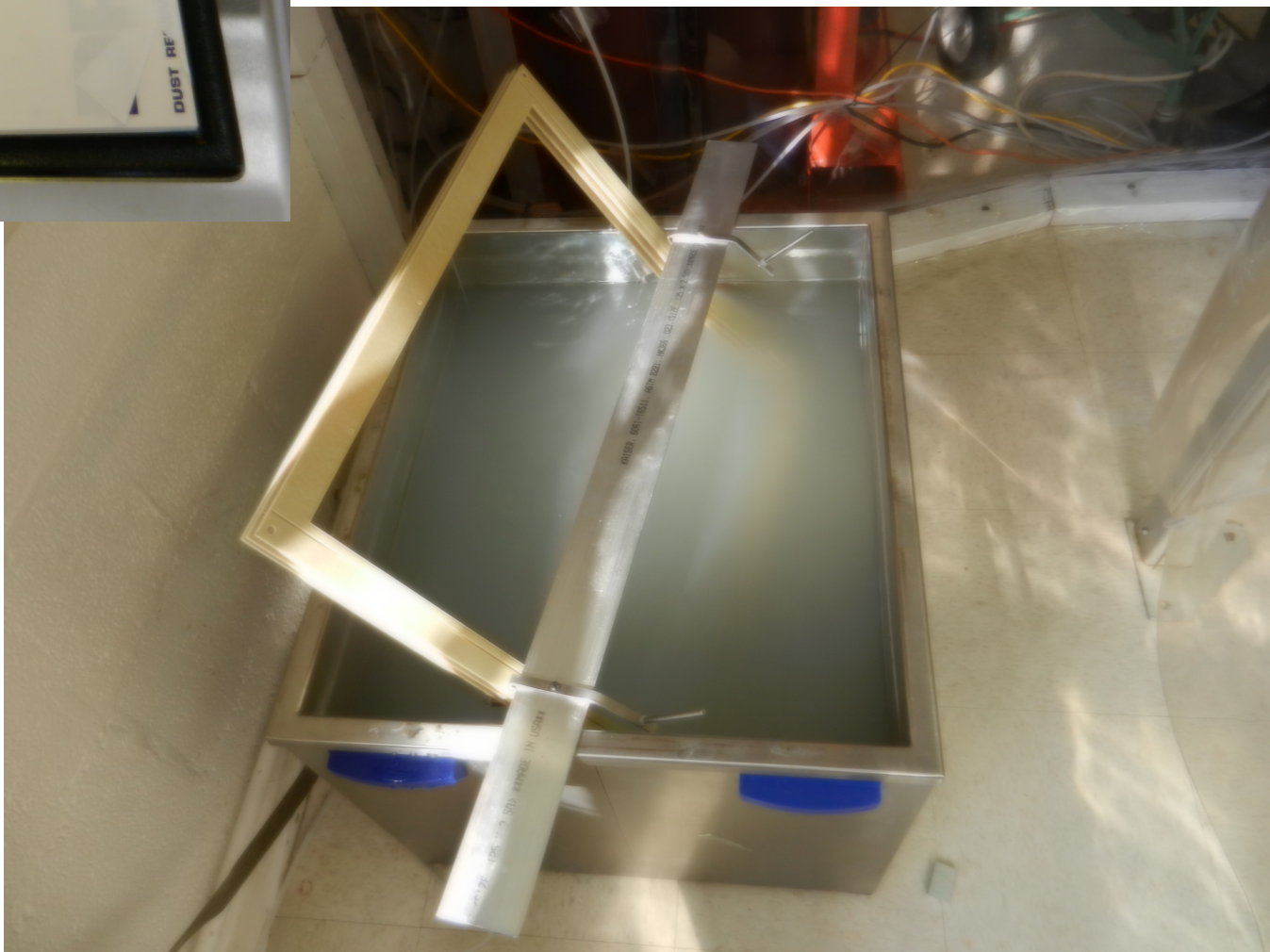
## Progress so far

- Added the new clean room
- Setup and instrumented the GEM lab for new production.
- Established the new procedure for GEM foil testing
- Finished the construction of the first 50 cm x 50 cm prototype this morning.
- First 40 cm x 50 cm prototype under testing at UVa with CERN SRS electronics; measuring resolution.
- Got the second 40 cm x 50 cm prototype working; sent to Jlab - now under testing with Italian APV electronics (Chao Gu and Bogdan)
- Finalized the new version of Italian electronics; in production now.
- Acquiring a 10,000 chan. SRS electronic system now.



> 1 M

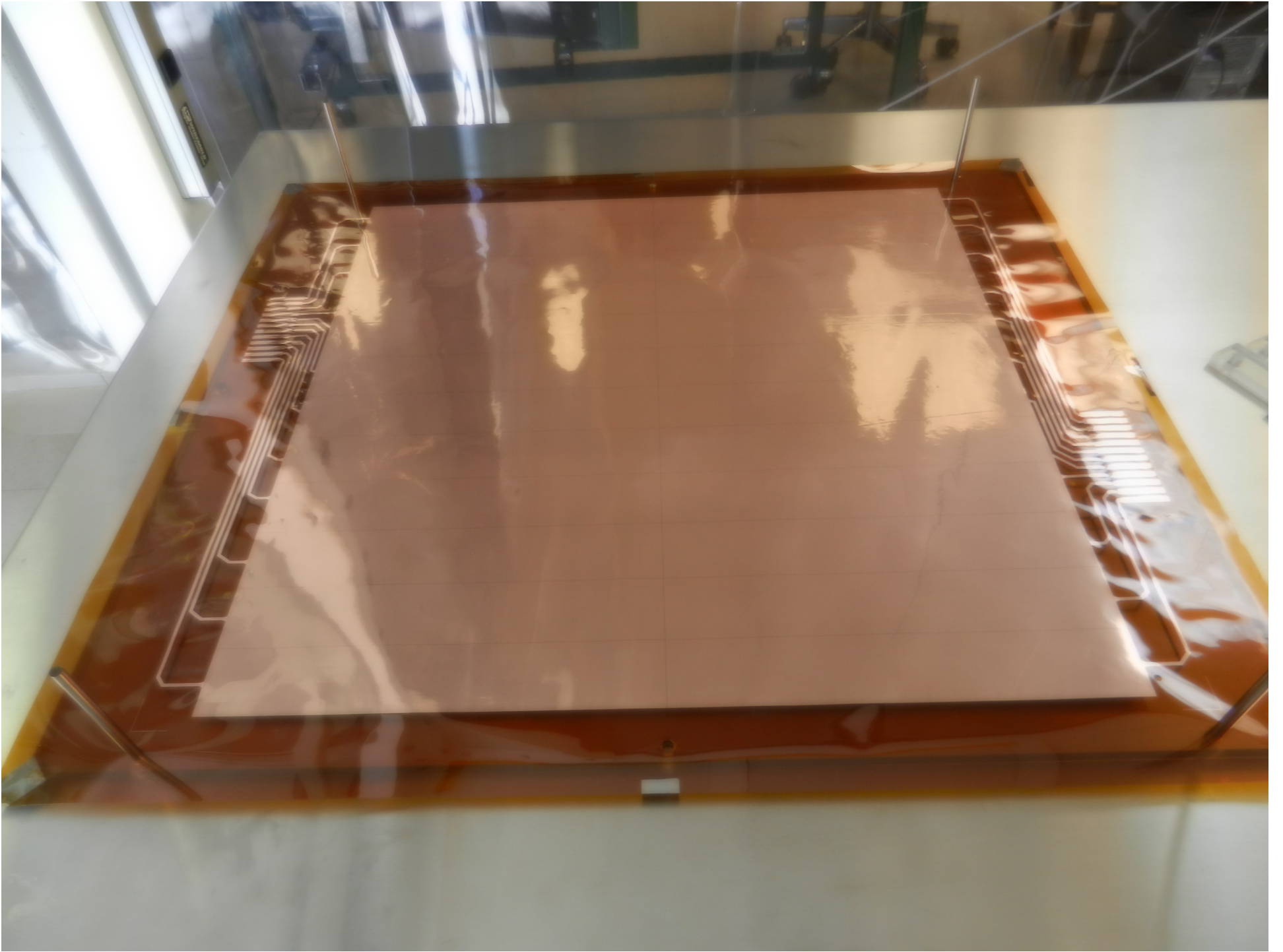






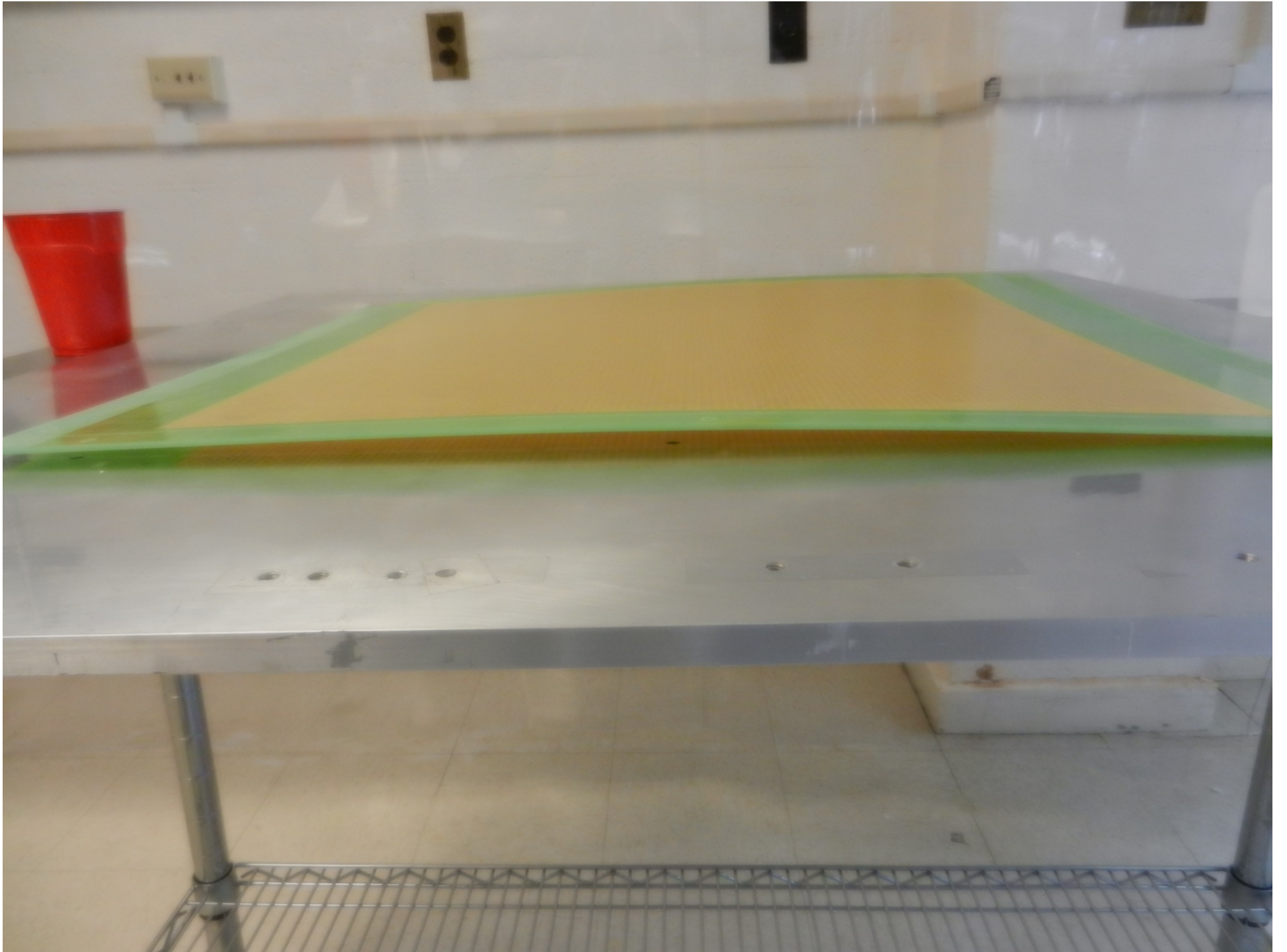




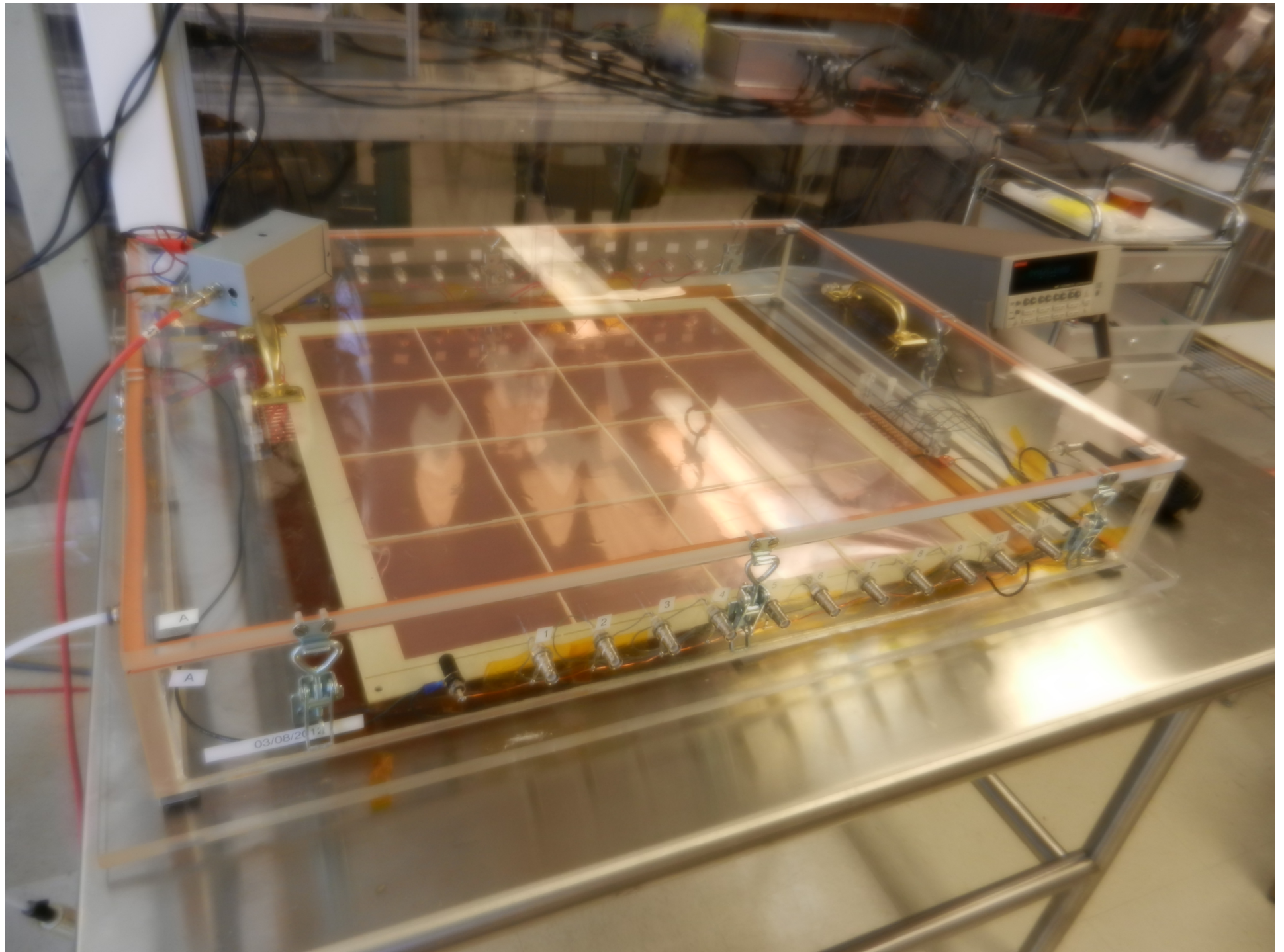




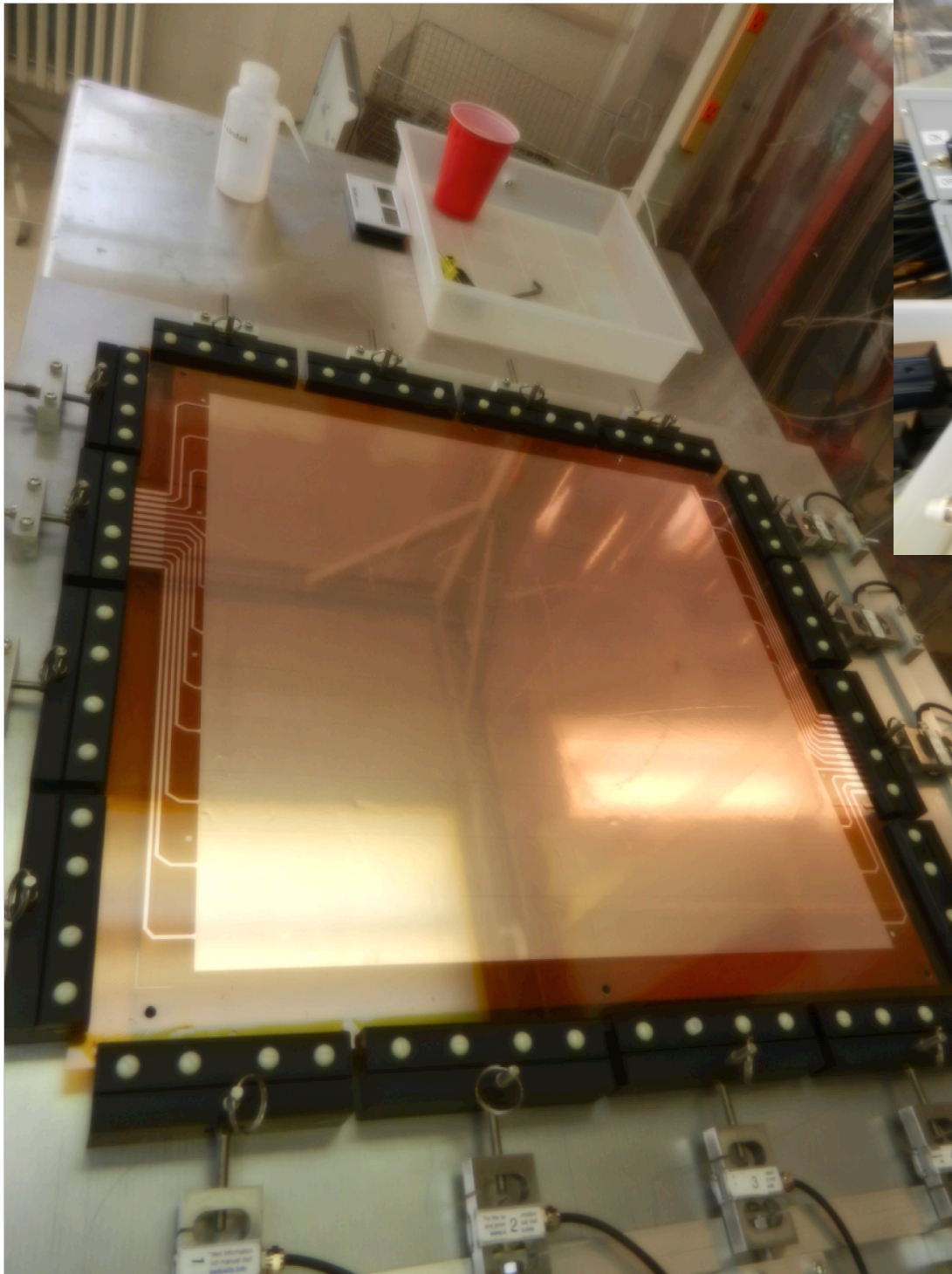




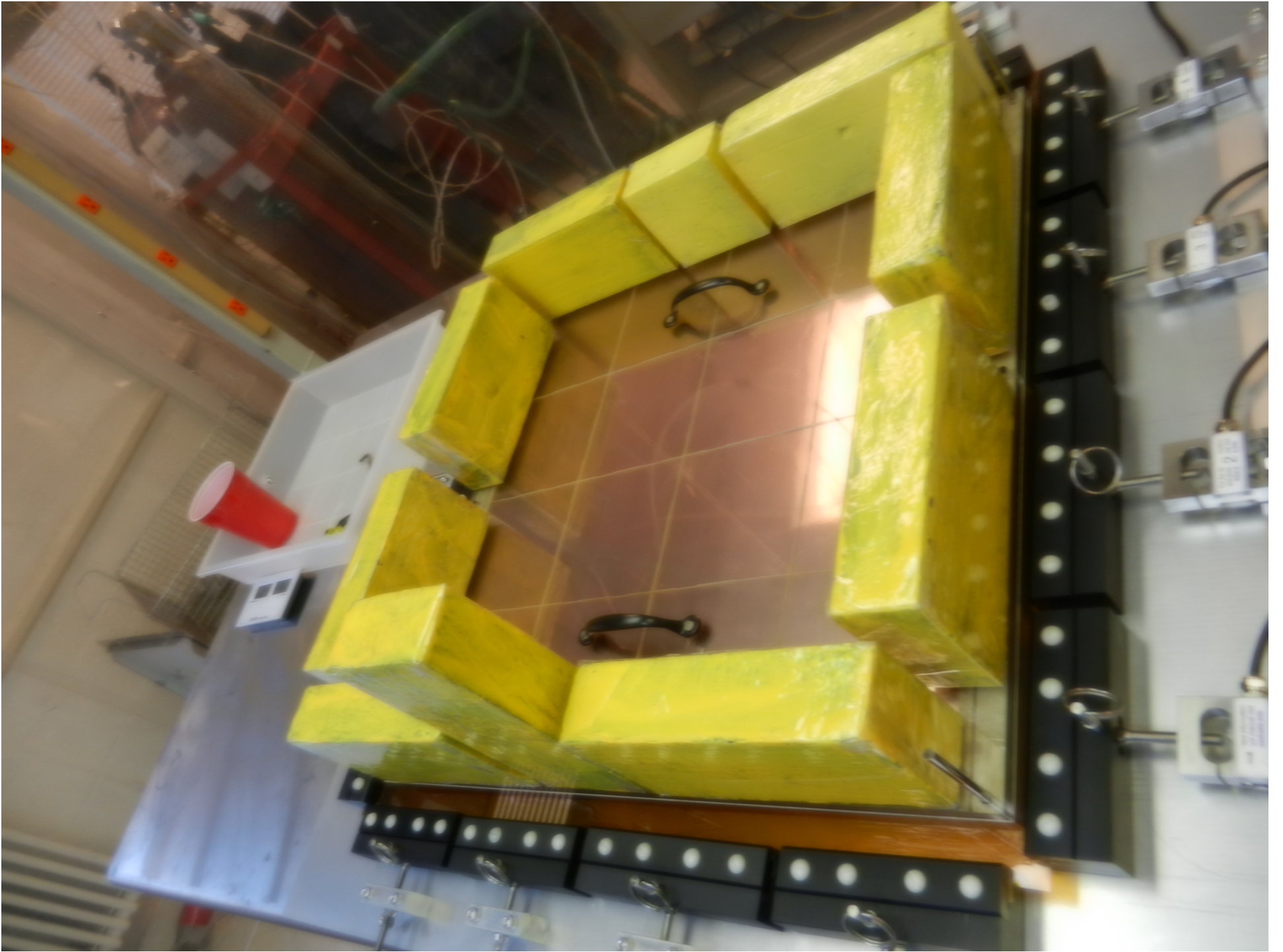




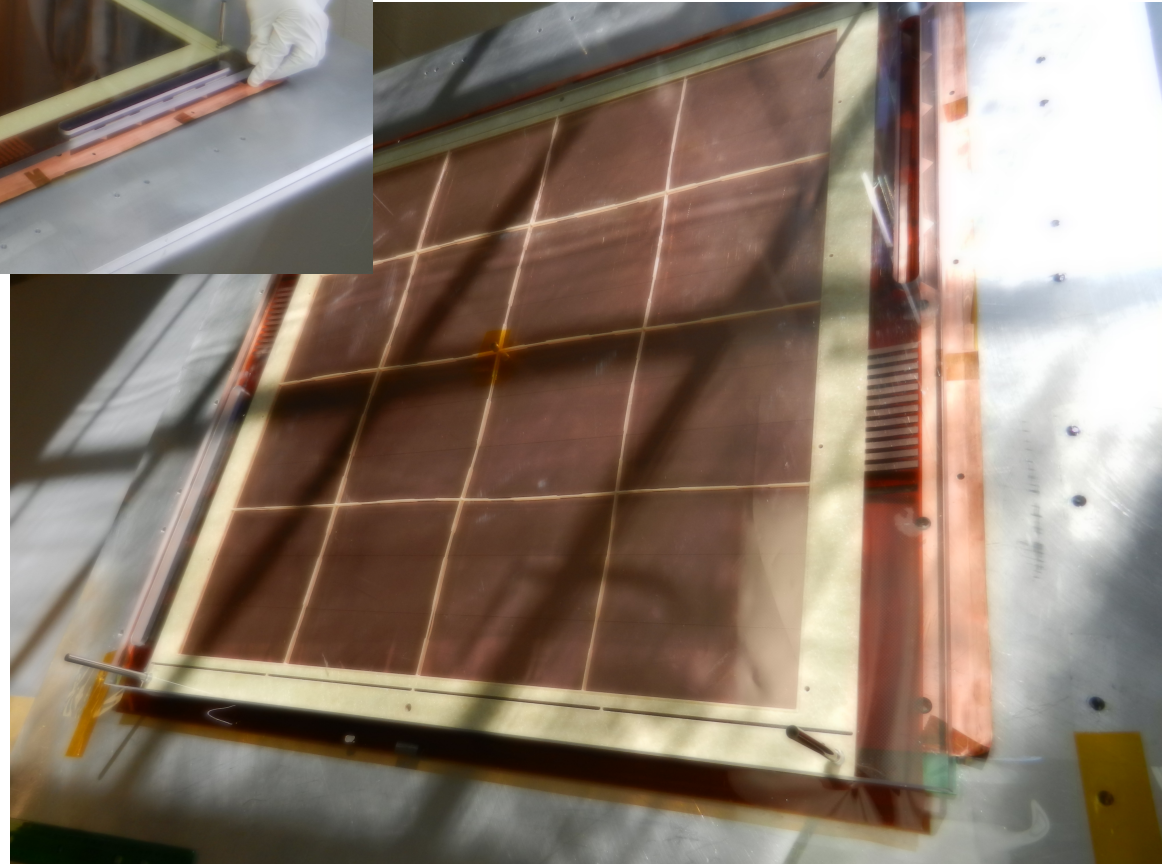
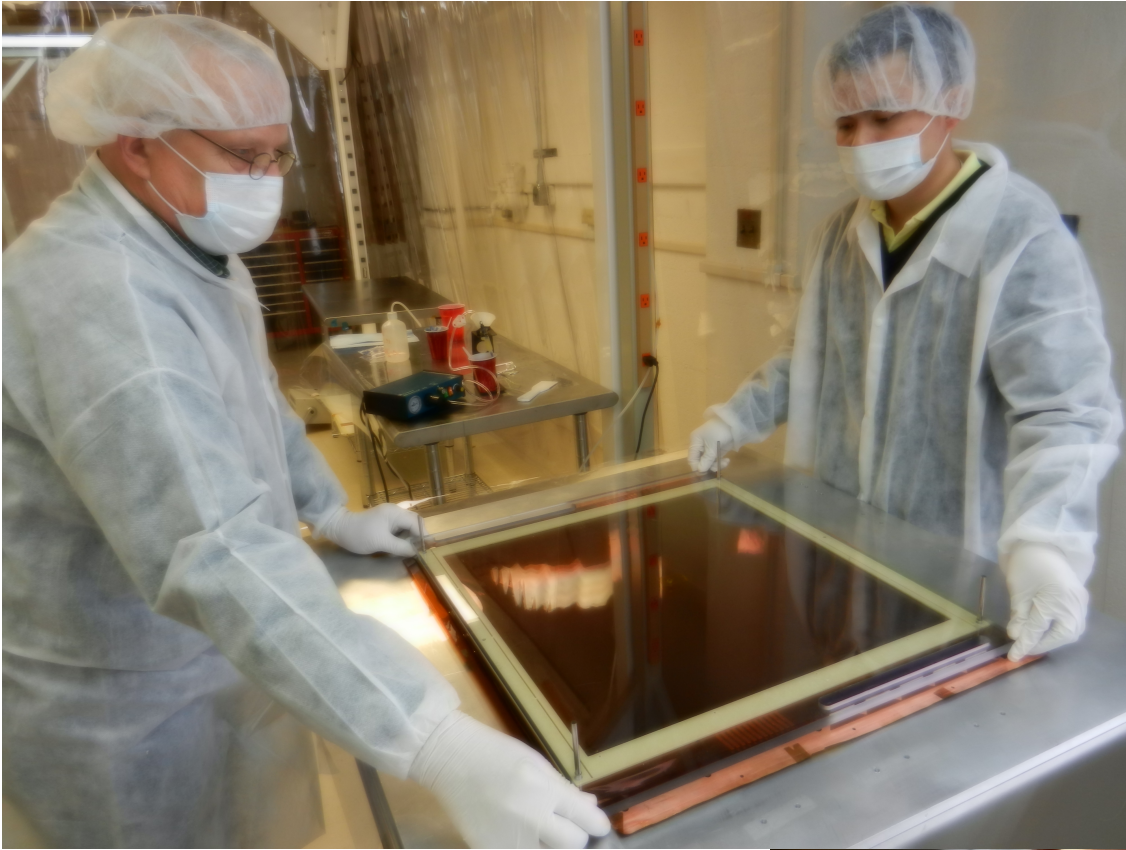


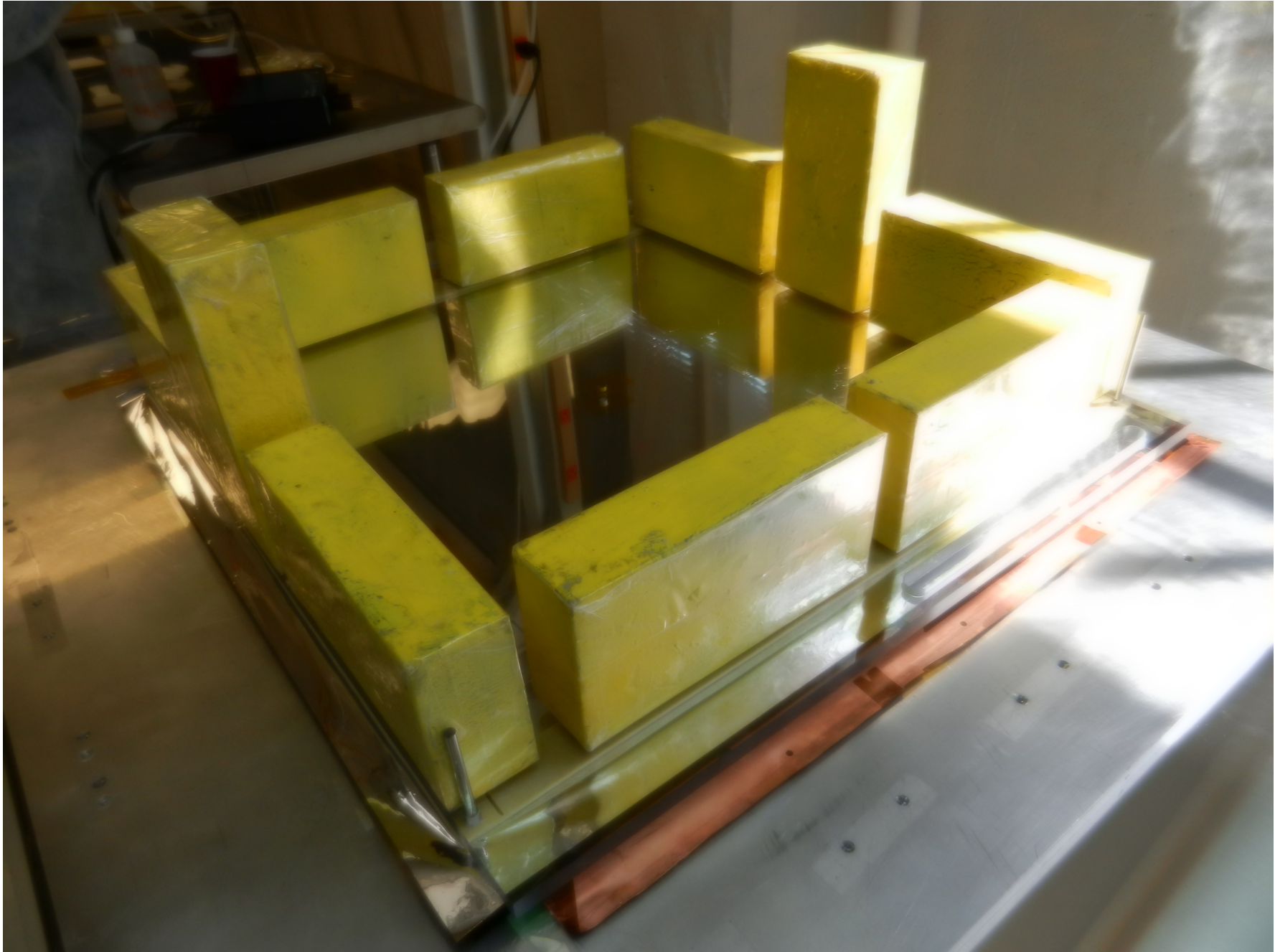






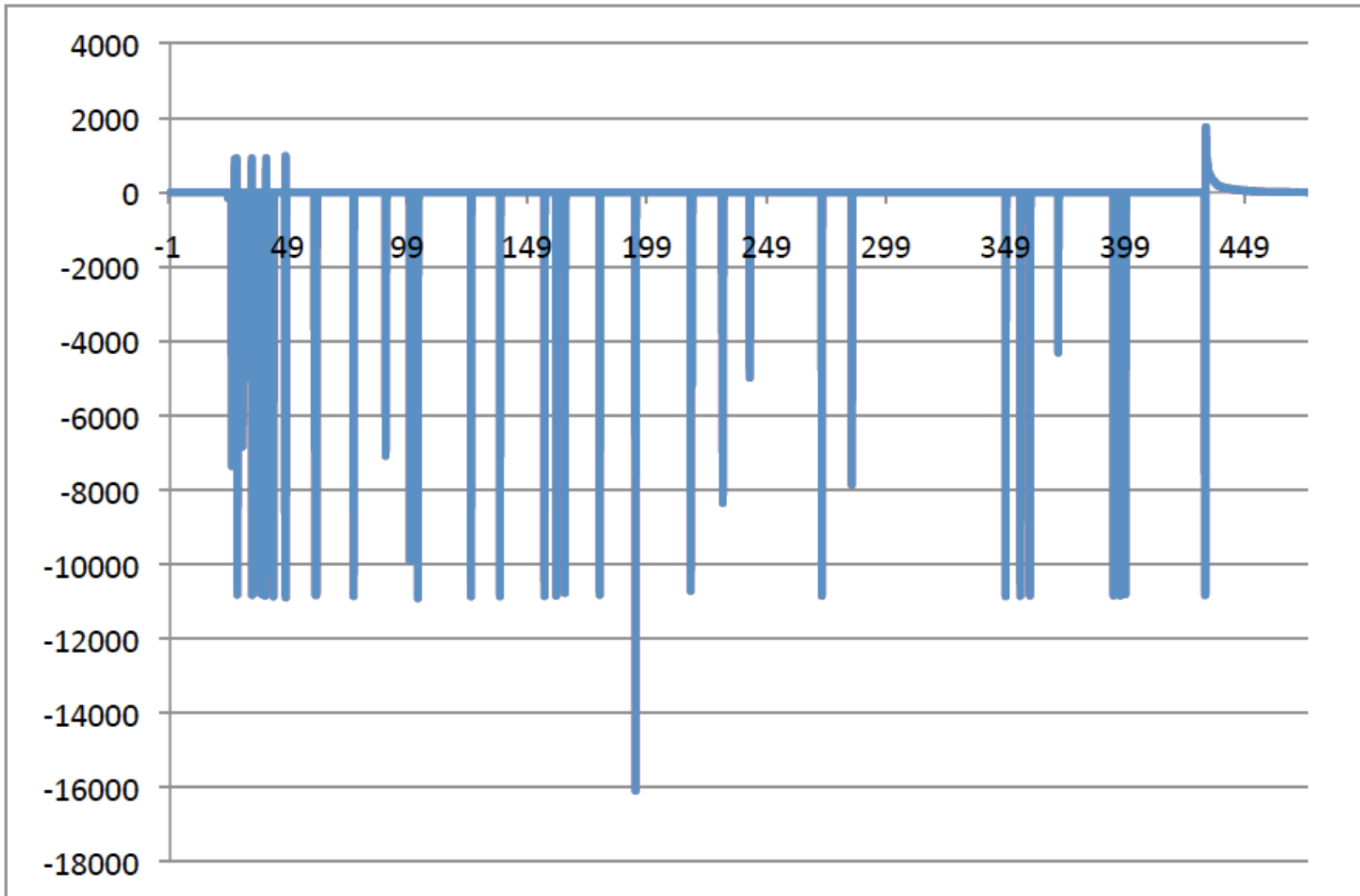








# HV testing procedure



The current reading for the testing of the "dirty" 10cm x 10 cm GEM foil. The horizontal axis is time in seconds, the vertical axis is current in nA.

# HV testing procedure

- Use a current trip level of 15 mA
- Use a maximum voltage of 550 V
- Use the ramp rate of 1200 V/s
- Test each sector under these conditions for 2 minutes.
- Set the acceptance criterion at  $< 5$  nA; but note down sectors with more than 1 nA.
- It is normal to see repeated sparks during the first 30 seconds of the test, after this the spark rate should go down to about 1 -2 per minute. If there are more frequent sparking after 30 s, HV should be turned off and the foil examined for causes.

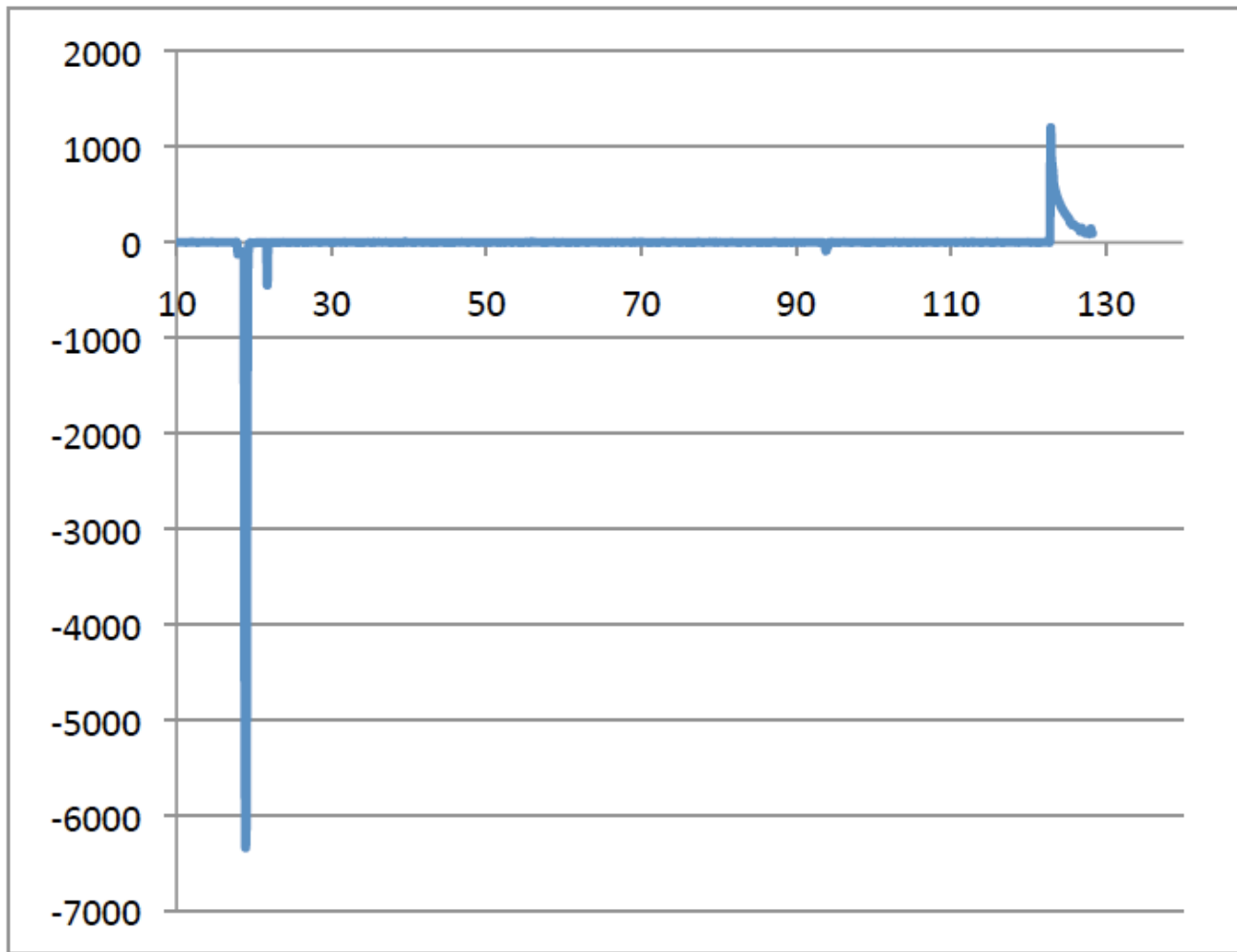


Figure 2: The current reading for the testing of a GEM sector from a 50 cm 50 cm SBS foil using the above procedure. The horizontal axis is time in seconds, the vertical axis is current in nA.



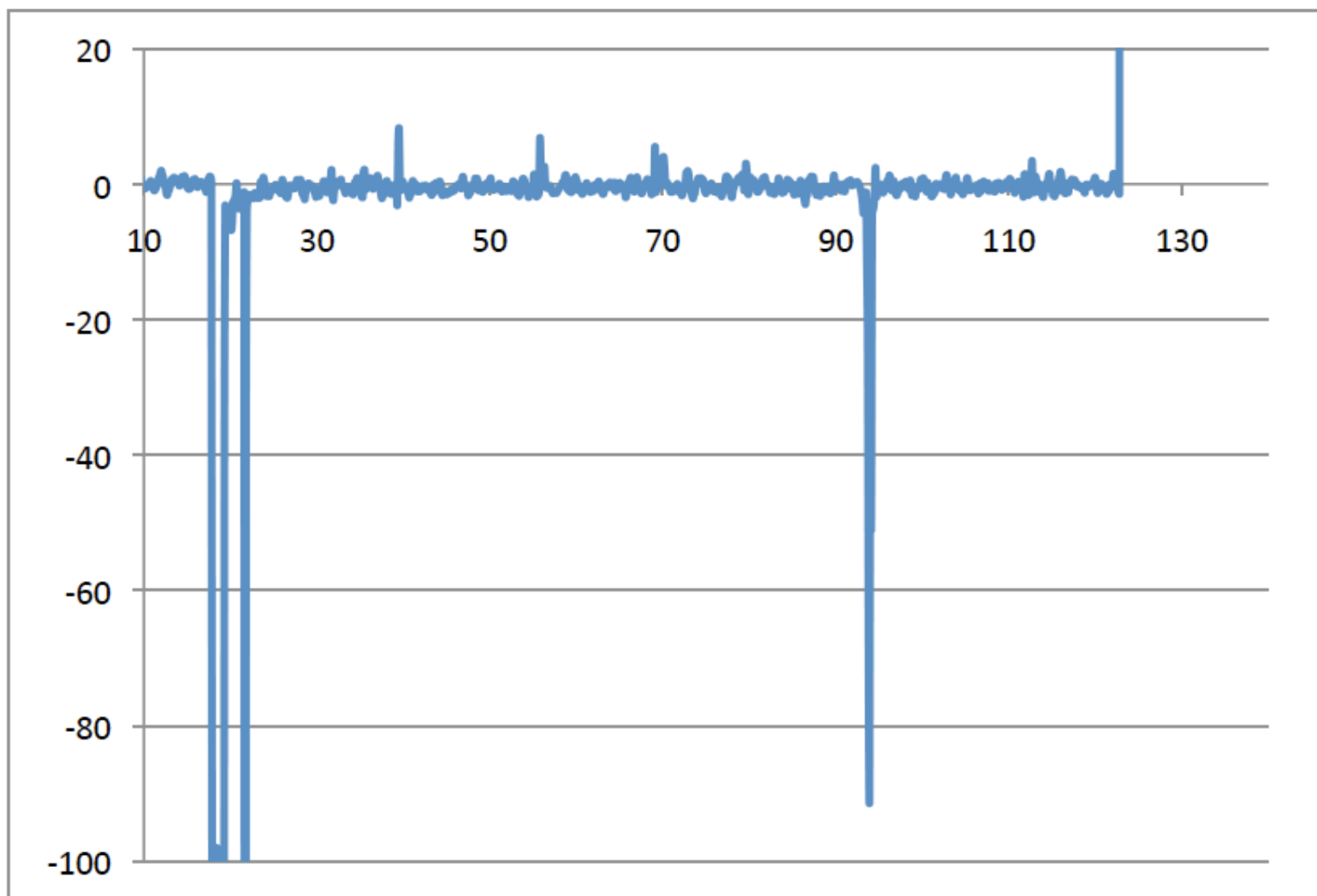


Figure 3: Same as figure 2, but zoomed in on the vertical axis; the  $\sim 100$  nA spike may be associated with someone moving near the dry N<sub>2</sub> HV test box.

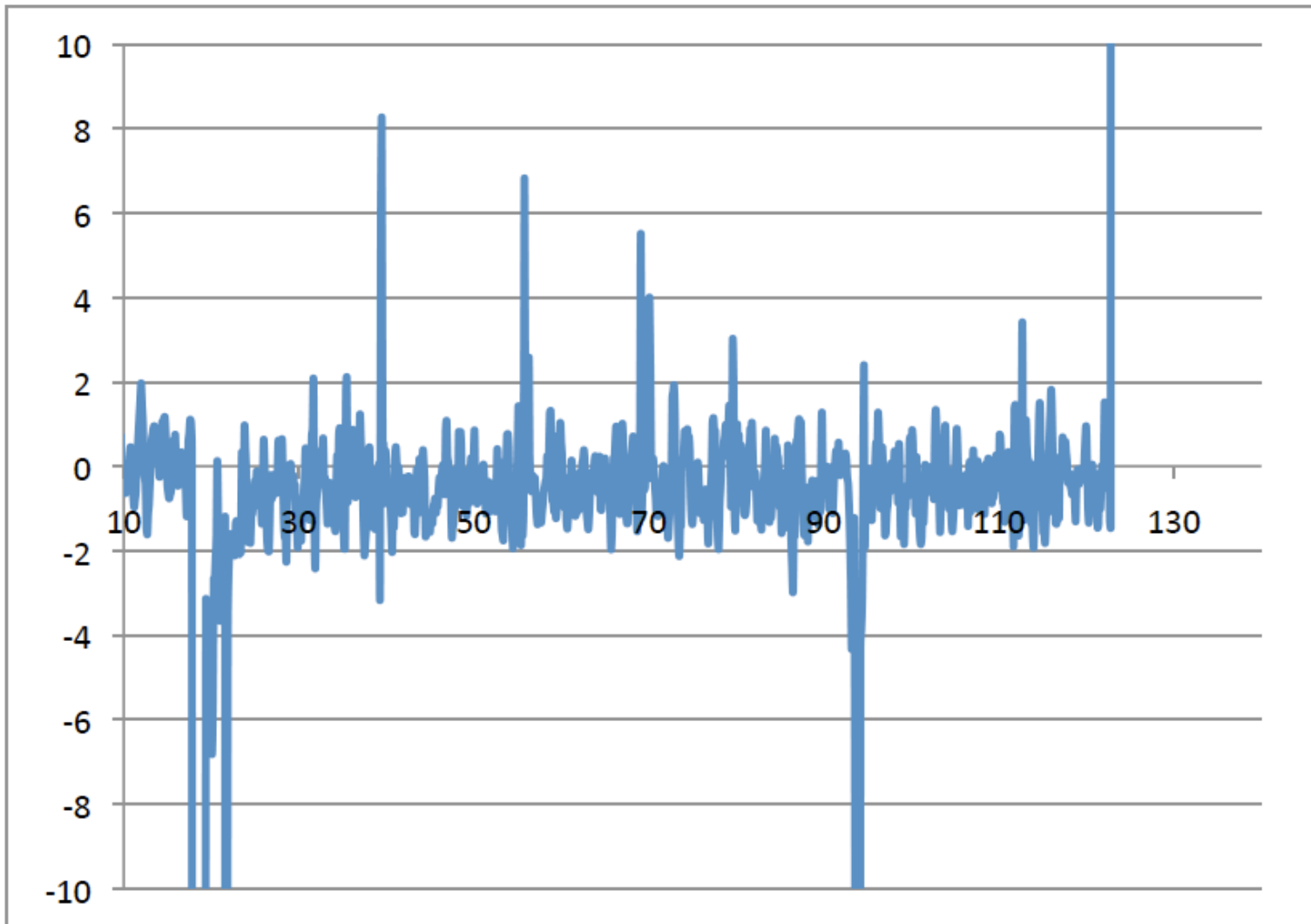


Figure 3: Same as figure 2, but zoomed in on the vertical axis showing the stable leakage current of  $\sim 1$  nA. The periodic oscillation shows the level of noise at this sampling rate (120 ms) .

## Plan for the next few months

- Test the first 50 x 50 prototype
- Build the second 50 x 50 prototype in April
- Make the needed small adjustments in the design and order the parts for the two final prototype by May.
- Build those in the Summer
- Assemble a full SBS back tracker layer with the 4 prototypes.
- Start SBS GEM production in the Fall
- High rate tests of electronics at Fermi lab beam test in October.