# LAr R&D Progress Updates

Yichen

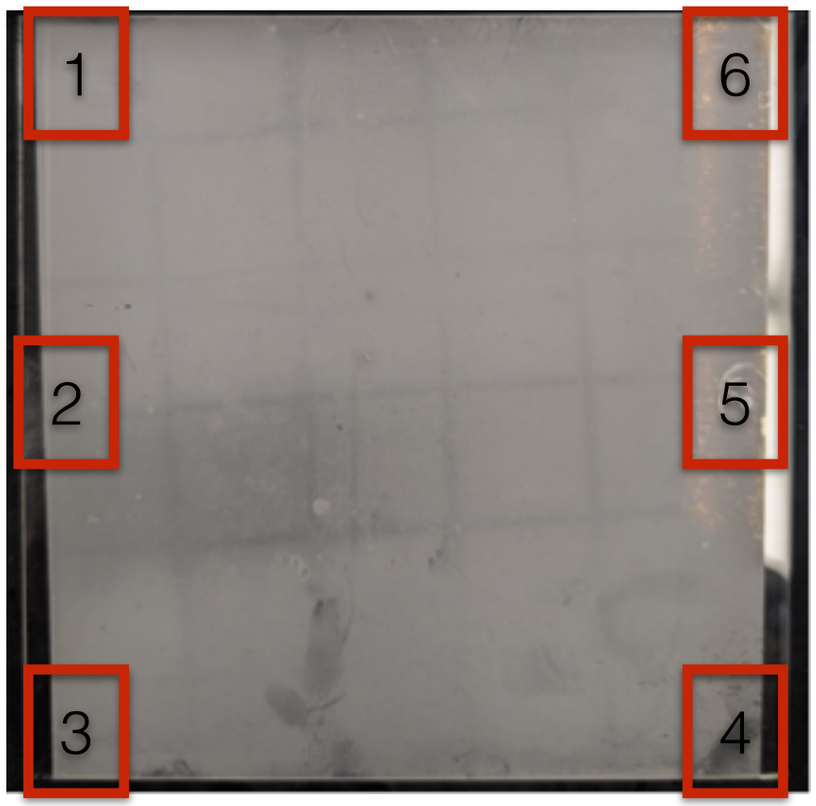
9/2/25

# Lab Safety and Space Management

- **Power outage on campus**
  - Planned outage on the north campus around RHIC area over the weekend
    - No impact to 510
    - Power resumed on the same day
  - Unexpected power outage at Bldg 725 last week
    - SDCC data center was offline
    - No known impact to us so far
- **ESH Walthru on 08/27 Wednesday**
  - LAr test stand received no complains
  - One CAEN HV supply found in CE lab requiring EEI inspection
  - Coordinating with Shanshan for the EEI inspection
- **LN2 dewar fittings**
  - CE test stand LN2 fittings were worn out
  - Replacement on order
  - Could be a good tip for the future summer students

# Thickness measurement

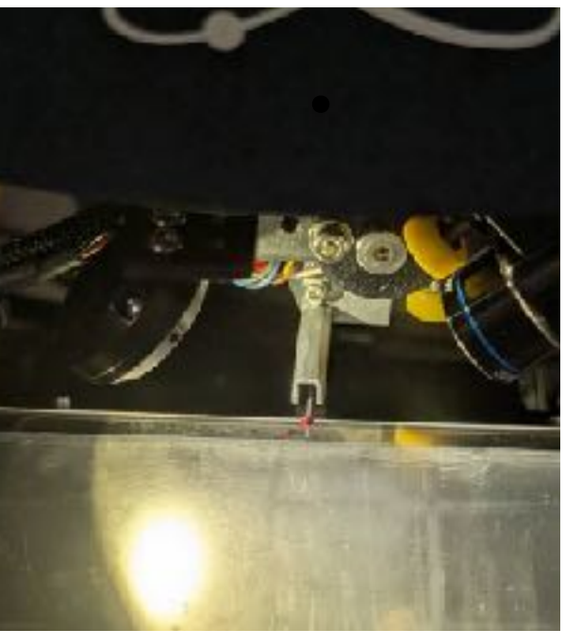
- **Coating thickness measurement using profiler at IO**
  - I conducted 6 points measurement on each substrate at corners and centers
  - The thickness is measured only <3.5 mm away from the step/edge of coating
  - All data uploaded to OneDrive
  - A few videos on YouTube:
    - https://www.youtube.com/watch?v=2Ep0cyhDJ7U
    - https://www.youtube.com/shorts/ztcLcsn-GEQ

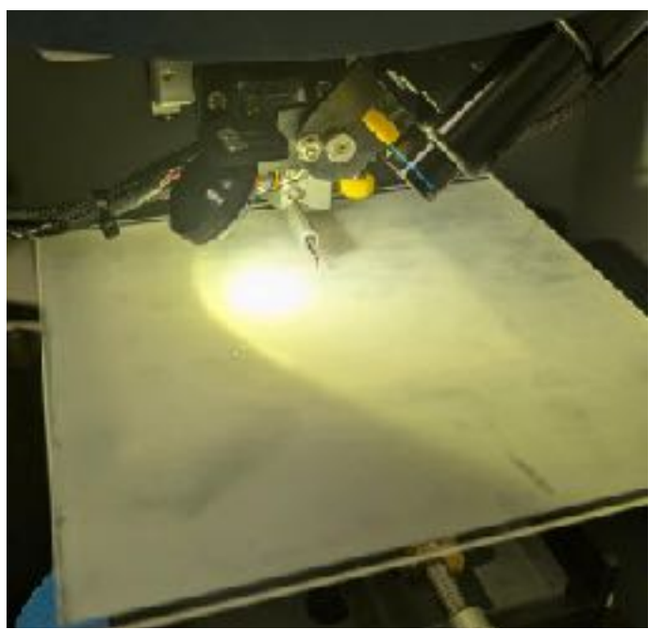


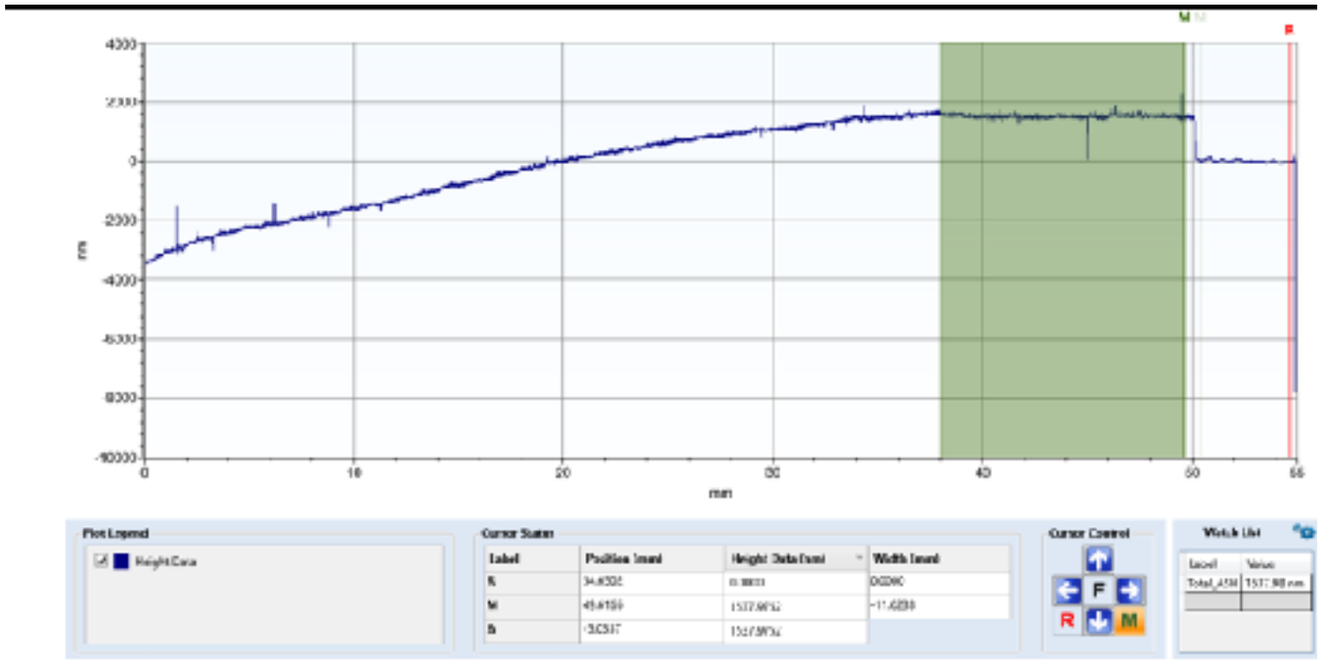
# Thickness measurement

- **Attempts to covering central area on the substrates**
  - After trying with several settings of the profilometer, I was able to cover to the area close to the center
  - Maximum scanning distance is 55mm, closer to the center of the substrate 71mm
  - Significant more coverage area 3.5mm —>55mm
  - The initial data shows strange features

3.5mm —>55mm







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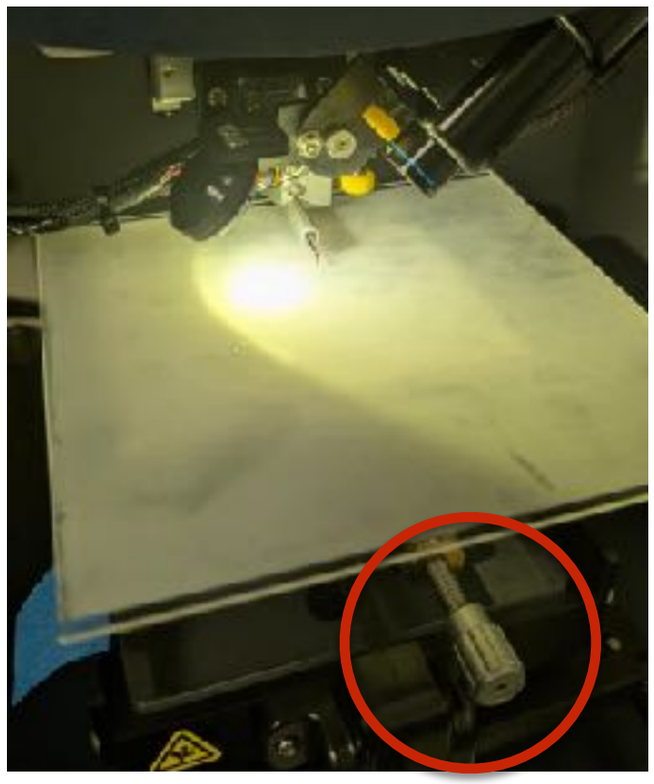
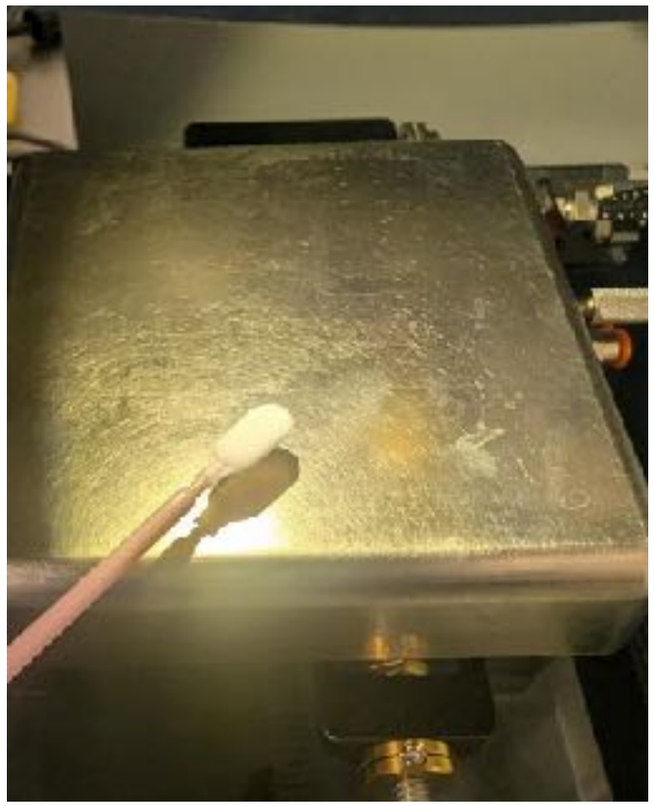
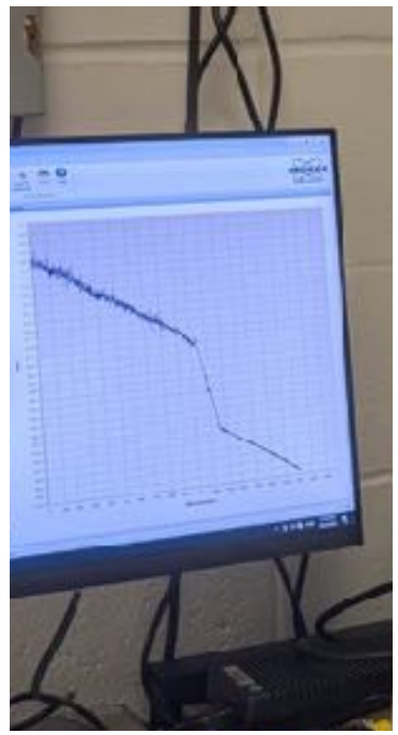
# Thickness measurement

- **Improvement on the profliometer thickness measurement**
  - I was suspecting the moving stage is not leveled up
    - Learned from Abdul about the way of adjustment, 1-D adjustment
    - Ensuring the raw data is flat before software correction, down to 6.5 um range
  - The flatness of the holder platform
    - Cleaned up the platform carefully with compressed air and alcohol
    - Clean the back of the substrate

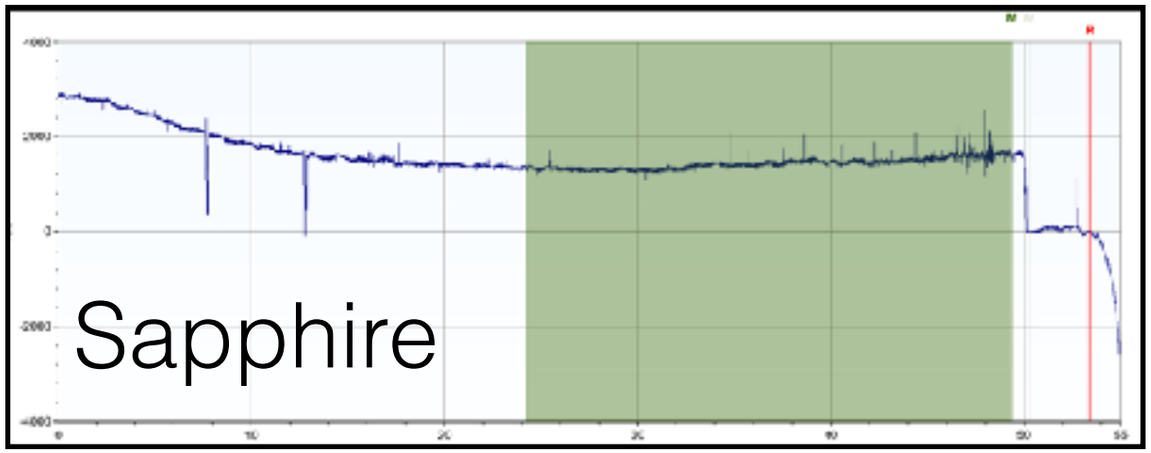


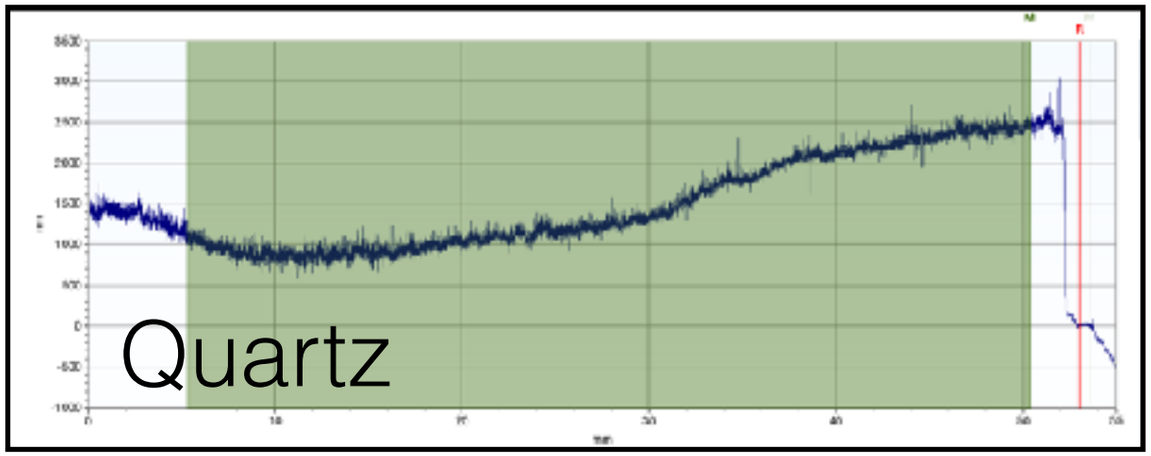


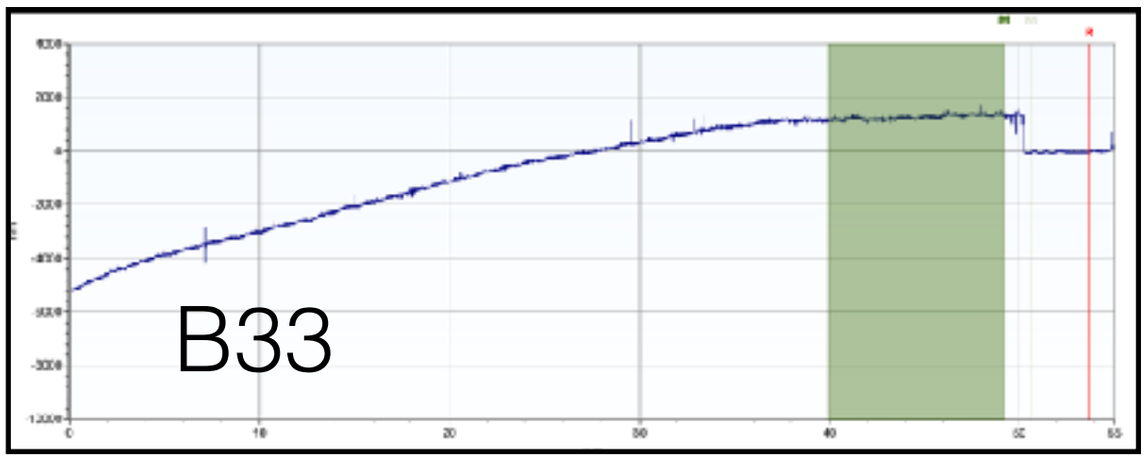


# Thickness measurement

- **Results after adjustment**
  - The general ramping feature does not change with the attempted adjustment
  - The feature observed is the indication of the flatness of the substrates
  - Quite different flatness
  - No way to further improve with the profiometer
  - The profilometer method only works for short range from the step



# Thickness measurement

- **Future thickness measurement plan**
    - The ellipsometer is the way to go
        - Pros:
            - Full surface coverage
            - Multiple points on the surface
        - Cons:
            - Need to properly modeling
- Abdul made attempted with the parameters of pTP
    - There is a converge issue with the model due to surface quality
- I’m going to work with Abdul tomorrow to learn the operation of the ecllipsometer
    - I’ve went thru the manual over the weekend
- Abdul also mentioned a microscope method we will discuss tomorrow

# Diamond substrate measurement

- **Alpha source excitation measurement**
  - Erik at IO tried with the diamond powder coated samples with alpha source excitation
  - No expected emission was observed
  - Most likely, the coating is not crystalized enough
  - Working with the German company for improvement