



# Photocathode Implementation Plans at U.C. Berkeley



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LAPP Photocathode Godparent Meeting  
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# Bialkali Photocathode Implementation



Given that we have established repeatable bialkali photocathodes on relevant window substrates we need to address issues regarding the actual use of the windows and cathodes to support real tube construction.

Establish 8.7" window photocathodes in tube process tank

- Commission large sealed tube process tank
- Prepare, process and measure 8" bialkali

Establish 8.7" window Indium seal

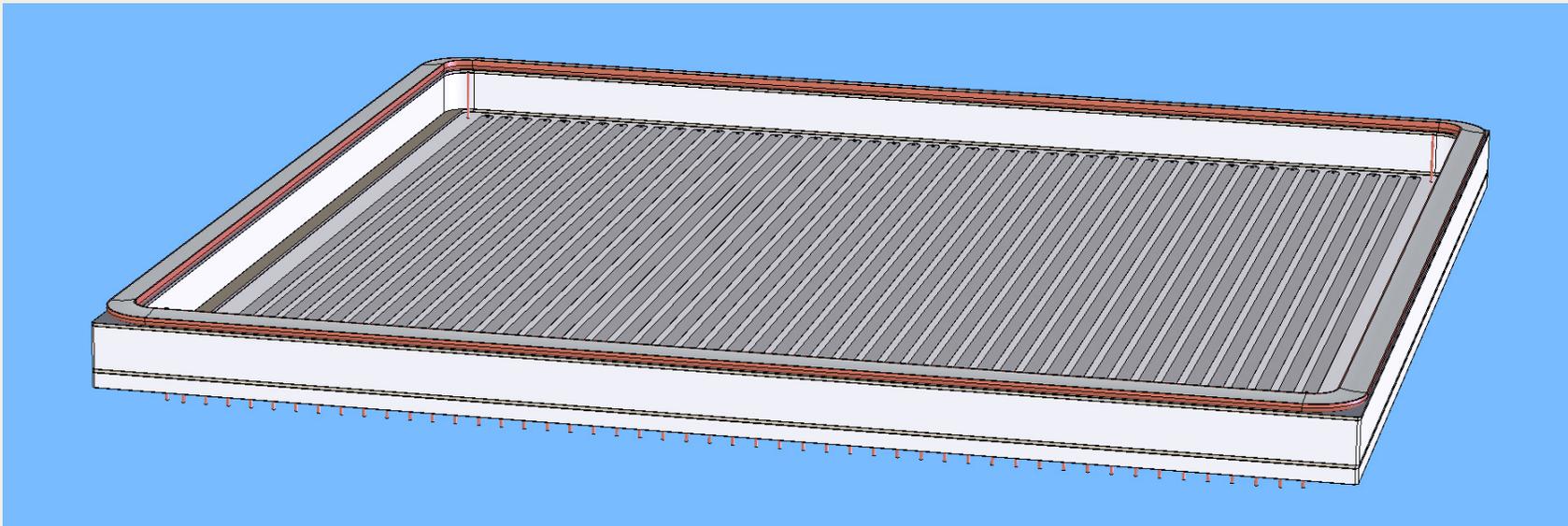
- Indium seal trials on small windows
- Indium seal trials on large windows
- Process large cathode and test seal in PC chamber



# Brazed Assembly Pre-Process Preparation – Indium Seal



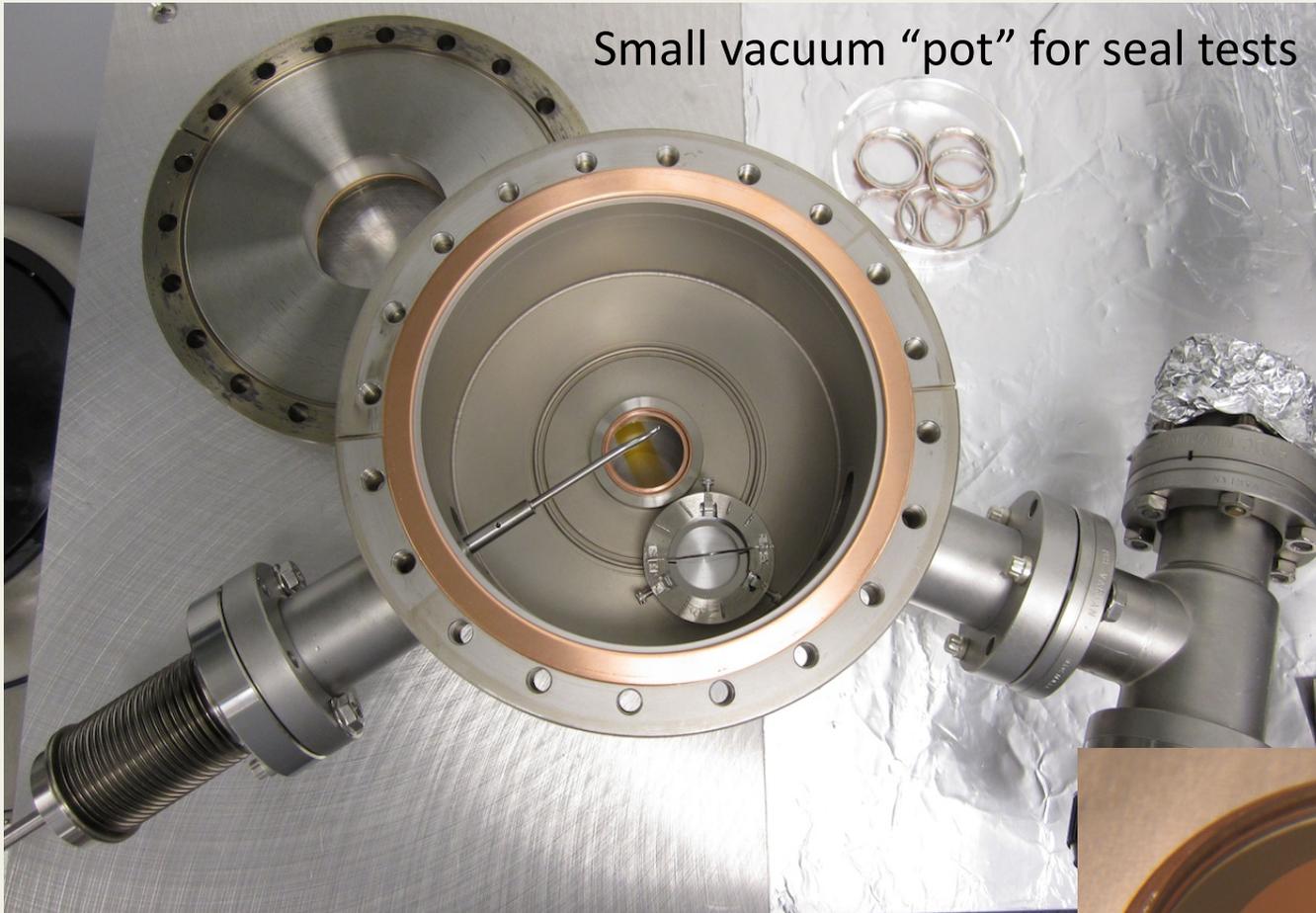
- Leak check (requires support jig)
- Remove excess braze run-out
- Clean
- Load InBi alloy in cup
- Remove oxides
- Vacuum bake at  $\sim 350^{\circ}\text{C}$
- Leak check again
- More oxide removal if needed
- Install getters
- Ready for tube build



We have done many hot Indium seals, 1" to 5", using NiCr+Cu+InBi or InSn on round and square formats successfully



# Indium Seal Tests – Small seals



Small vacuum "pot" for seal tests

1.3" Cu-InBi wells



Using our standard processes make vacuum seal tests in vacuum on 1.3" windows and Cu-InBi  
Wet In well – vacuum degas - oxide removal  
NiCr/Cu window coating  
~110°C vacuum seal

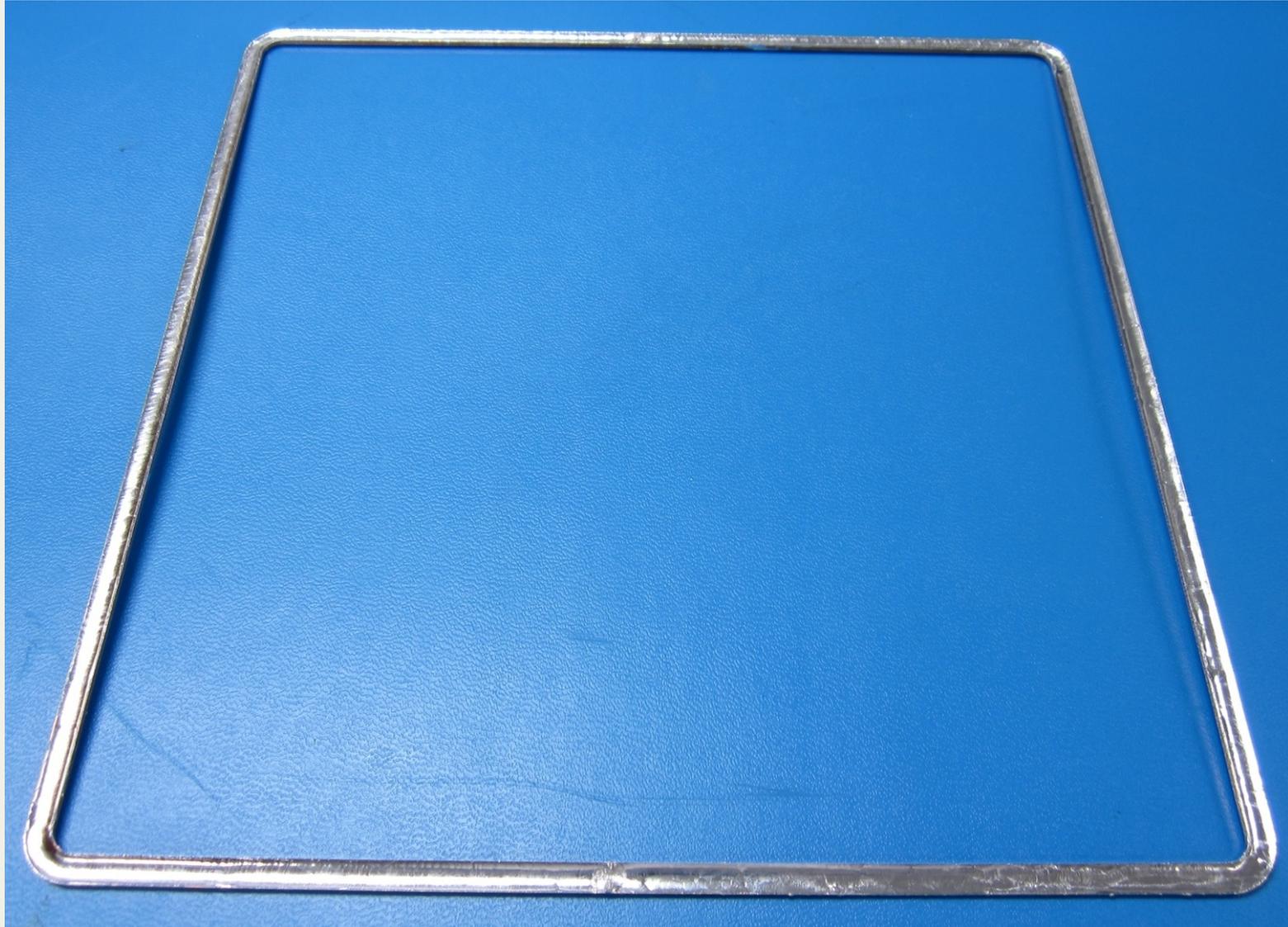


Test seal configuration



# 8" Indium well Tests

InBi filled Cu 8" well from the top seal of 8" tube





# 8" Indium well Tests



## Close up of Indium fill on 8" Cu well



Have done InBi fill and wetting  
Did UHV bake at 370-400°C for outgassing and oxide  
Did surface oxide removal

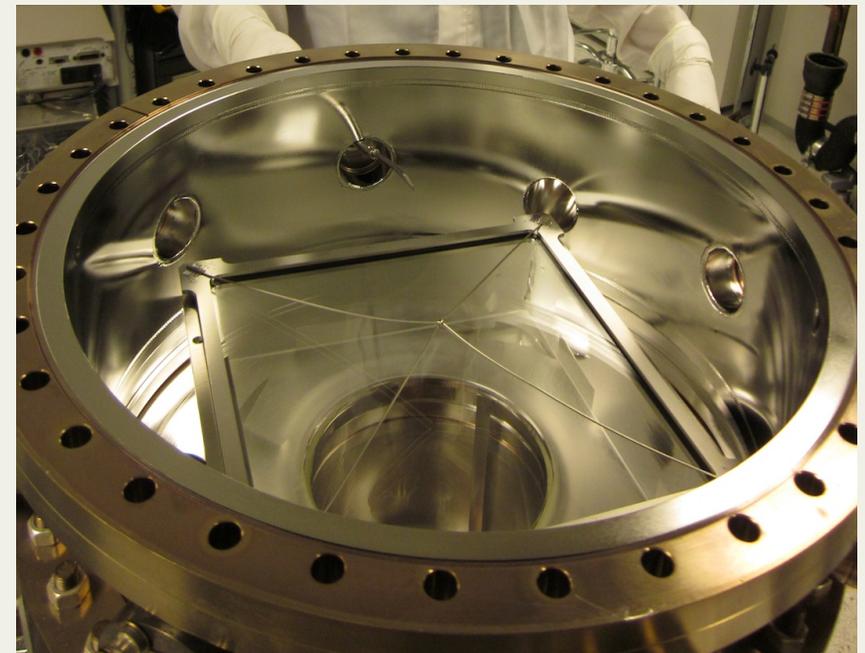
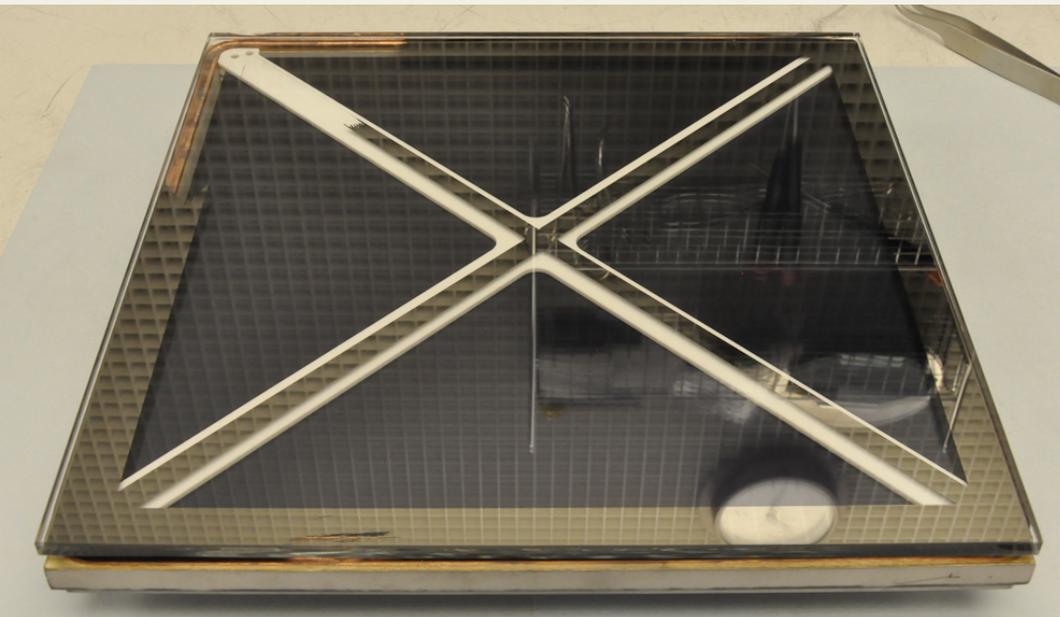




# Trial Full Size Indium Seals



Use 8" In filled wells and brazed detector bodies with windows in PC tank  
Leak check to  $10^{-10}$  Torr post seal test





# Photocathode Trials in Process Tank



Establish 8.7" window photocathodes in tube process tank

- Commission large sealed tube process tank

  - Install forming well hardware and alkalis

  - Install translator system

  - Illumination and signal monitoring

- Prepare, process and measure 8" bialkali

  - Vacuum bake

  - Shoot cathode, monitor signal, RGA, etc

  - Measure QE, uniformity, noise(?)



# Large Sealed Tube Process Tank



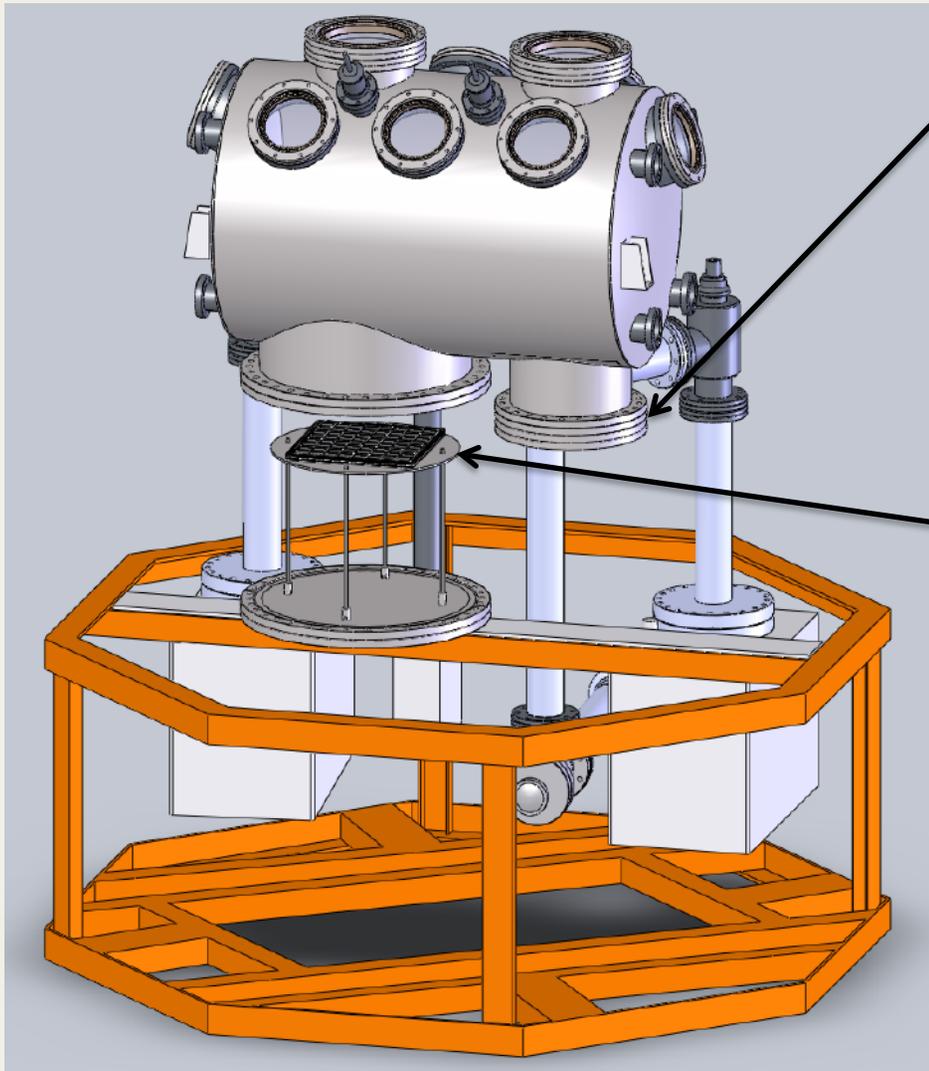


# Large Sealed Tube Process Tank Bakeout





# Process Chamber Photocathode Load



- Chamber ready for cathode shoot end of July
- Cathode materials loaded in the forming well
- Window on handling fixture loaded
- Seal chamber and evacuate
- Vac bake
- Stabilize temps for cathode shoot
- Do co-evap cathode
- Measure cathode hot
- Measure cathode cold
- Monitor QE for weeks



# Tube Ready for Processing

- Detector ready for chamber load
- NEW ISSUES TO REMEMBER
- MCPs have large area – will outgas alot during bakeout
- Need to scrub MCPs first
- Tube seal sequence time/temp profile should be OK but not yet confirmed
- Eventually find out about ion feedback on sealed tube lifetesting

