

University of Minnesota Nano Fabrication Center

Standard Operating Procedure

Equipment Name: CHA Electron Beam Evaporator (Changing Fixtures)

Coral Name: ebevap-cha

Revision Number: 5

Model: SEC 600

Revisionist: L. Matzke

Location: Bay 3

Date: 07/26/07

1 Description

The CHA Evaporator has two fixtures. The Lift-OFF fixture is used for subsequent lifting off of metals. The Planetary fixture is used to obtain better step coverage and conformity.

2 Safety

- a **Ask NFC staff or another student for assistance when changing out the fixtures if needed. The LIFT-OFF DOME is heavy, take care when lifting it off of the CHA.**
- b **Use a step stool if needed**

3 Restrictions/Requirements

- a Must be a qualified user on ebevap-cha.
- b **Verify that cooling water is OFF before venting.**
- c Fill out the log sheet for each run.

4 Required Facilities

- a Compressed air
- b Process chilled water
- c Nitrogen gas
- d Electrical Power
- e House Exhaust

5 Definitions

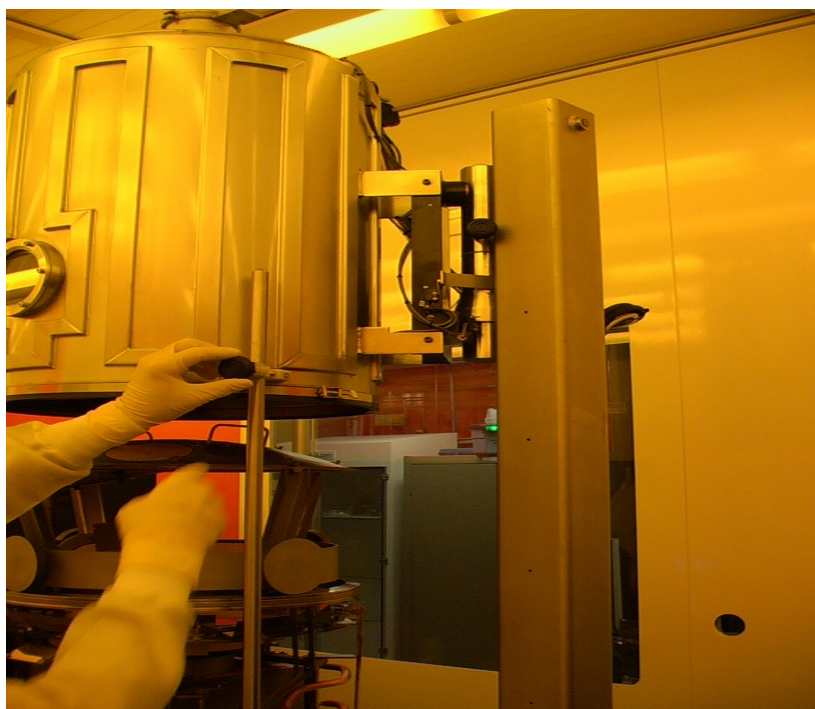
- a **LIFT-OFF Fixture:** The fixture used when wanting to do evaporation where a film is lifted off the substrate.
- b **PLANETARY Fixture:** The fixture used when wanting to do evaporation with good step coverage.

6 Setup

- a Engage the CHA in CORAL prior to starting work. This includes the time to change the fixture. Fill out the log sheet.
- b Moving the Bell Jar: Vent the chamber using the instructions found in the "ebevap-cha SOP". Lift the bell jar all the way up. Unscrew the lower alignment pin as indicated on the next page.

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- c From the front of the machine, unscrew the upper alignment pin. Use a step stool to reach it if necessary.



- d Swing bell jar around to the back of the system.

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7 Operating Instructions

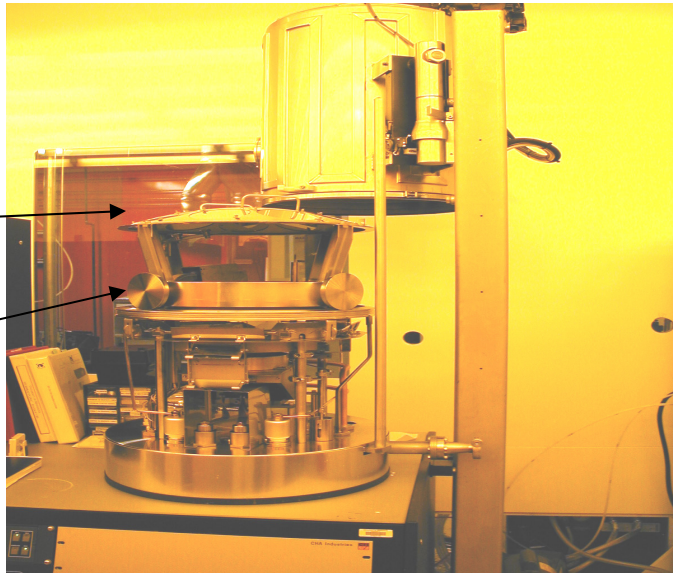
a Changing from LIFT-OFF fixture to PLANETARY fixture.

b

- i Making sure all wafers and holders have been removed from the lift-off dome, carefully remove both the LIFT-OFF DOME and FIXTURE and put them on the top of the cart. Use a step stool if necessary. **The dome and fixture are heavy so ask for assistance if needed from a staff member or other user.**

LIFT-OFF
DOME

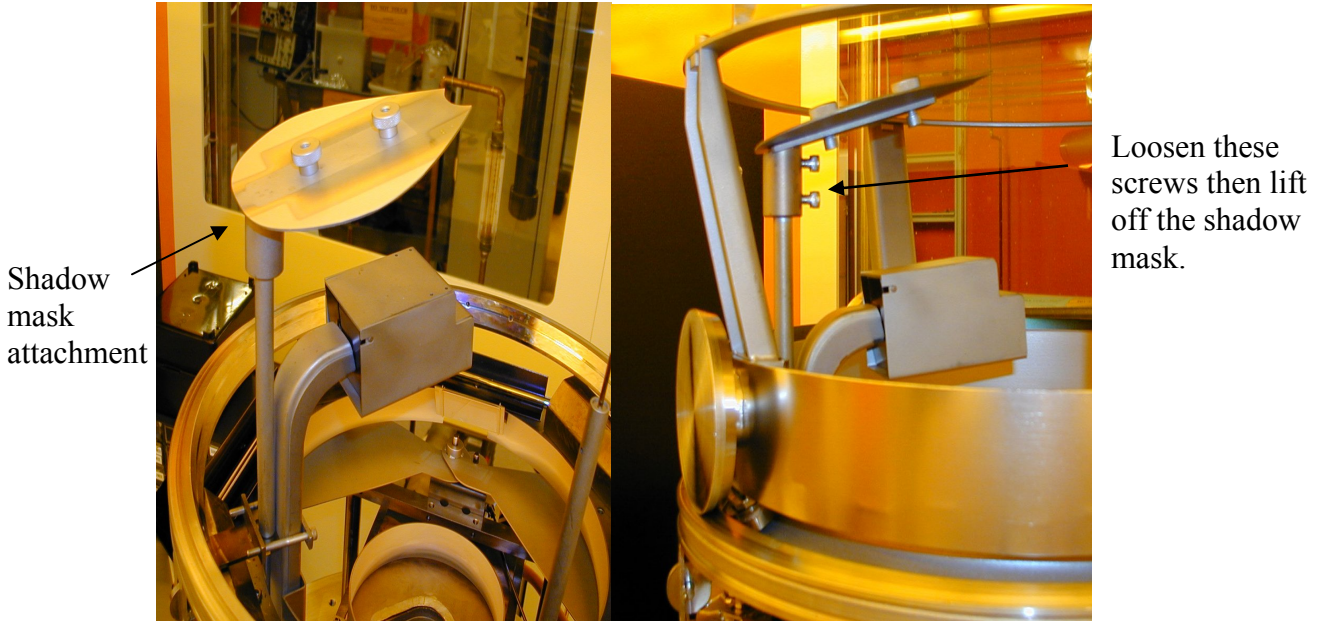
LIFT-OFF
FIXTURE



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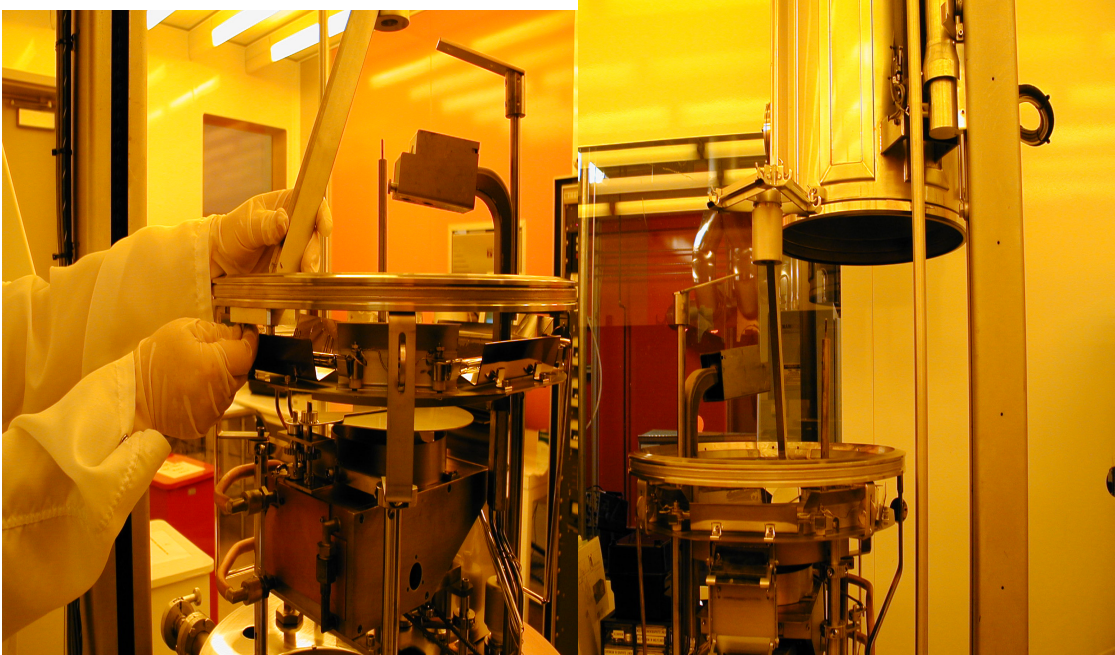
- ii Remove the shadow mask attachment by loosening the 2 screws holding it in place. Once the screws are removed, lift off the attachment and place on the cart.



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- iii Go around to the back of the machine. Attach the planet pole with the 2 screws provided. Use the Allen wrench to tighten the screws down. Make sure the flat part is flush against the ring.

Back View

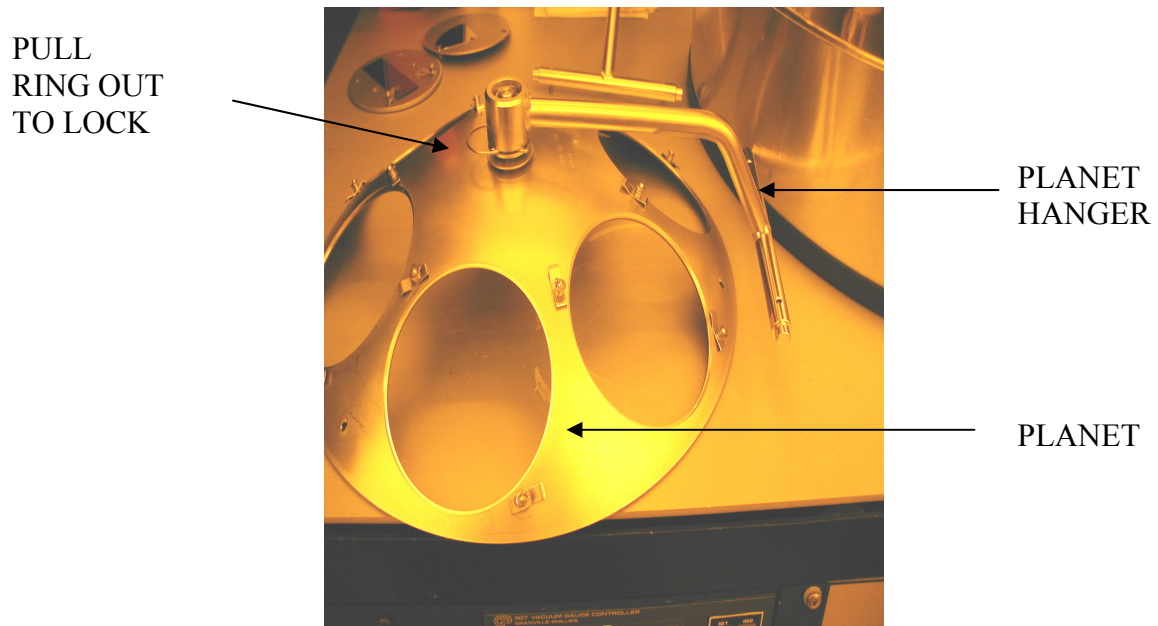
Front



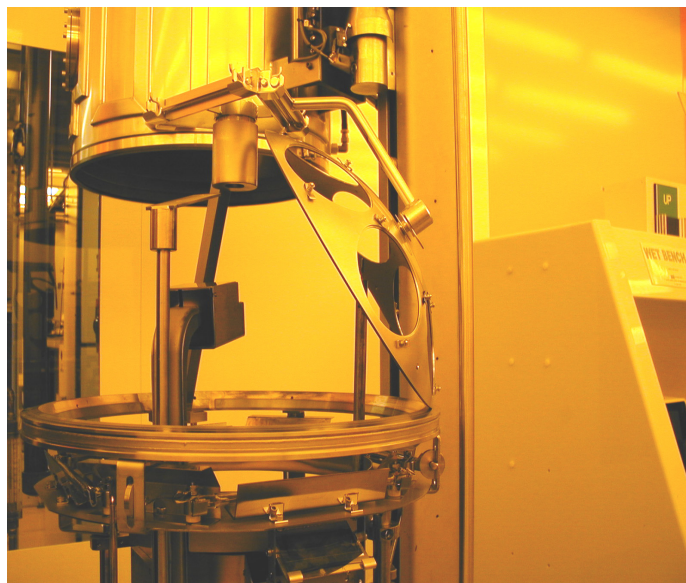
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- iv Attach the planet hanger to the planet, then lock in place.



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- v Attach planet with hanger to the fixture. Lift up then down. Verify that it rotates freely. 3 planets can be attached for a maximum of 18 wafers if needed. Fill all empty slots with dummy wafers or holders.



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- vi Swing bell jar back to the front and reattach the lower alignment pin. Screw the upper alignment pin into the bell jar arm. See pictures from set up section for assistance.
 - vii Lower the bell jar, pump down the CHA and start your run.
 - viii Return Allen wrenches and any remaining screws to the white tray on the cart.
- c Changing from PLANETARY fixture to LIFT-OFF fixture**
- i Vent the chamber per ebevap-cha SOP. Raise the bell jar all the way to the top.
 - ii Unscrew the lower alignment pin holding the bell jar. Unscrew the upper alignment pin. Swing the bell jar to the back of the system.

Lower Pin



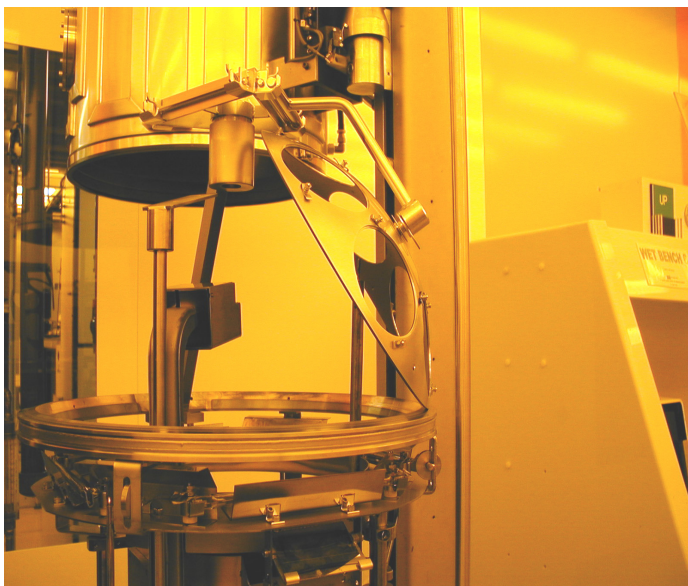
Upper Pin



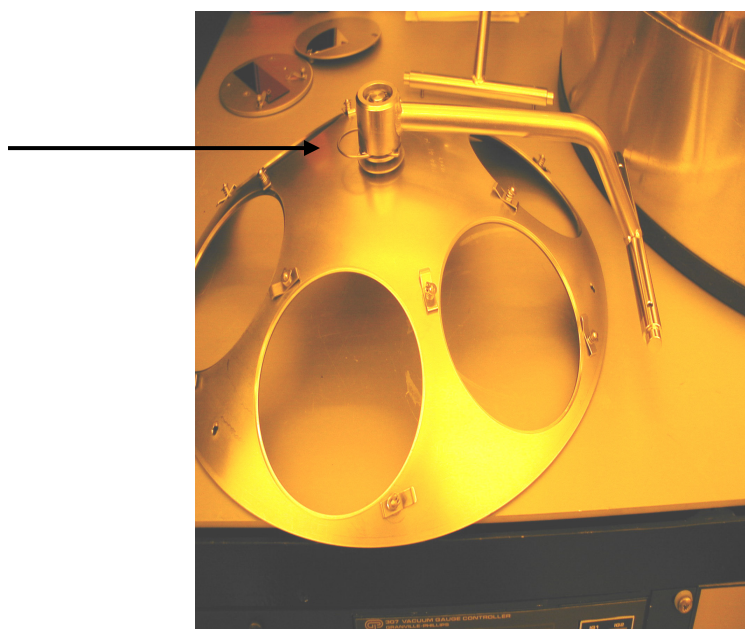
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- iii Remove the planets, and planet holder from the planetary fixture. Separate the holders and planets. Place them on the cart. To unlock the holder from the planet, push the ring in.



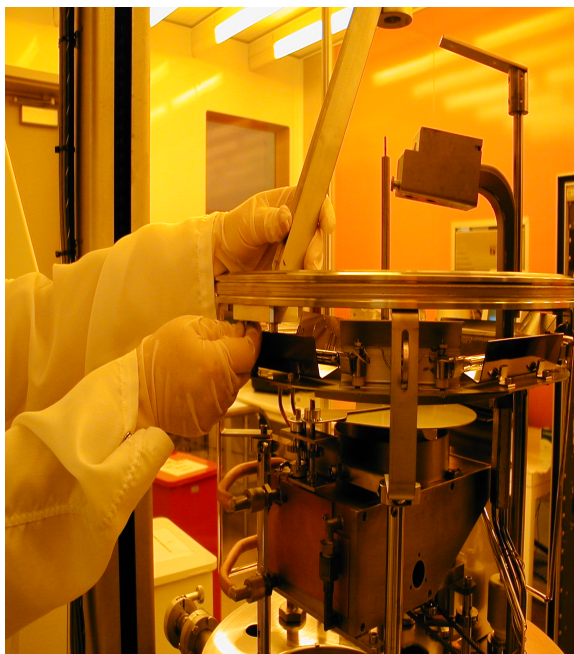
Push Ring
in to
Unlock



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- iv Unscrew the planetary pole.



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- v Reattach the shadow mask using both screws.

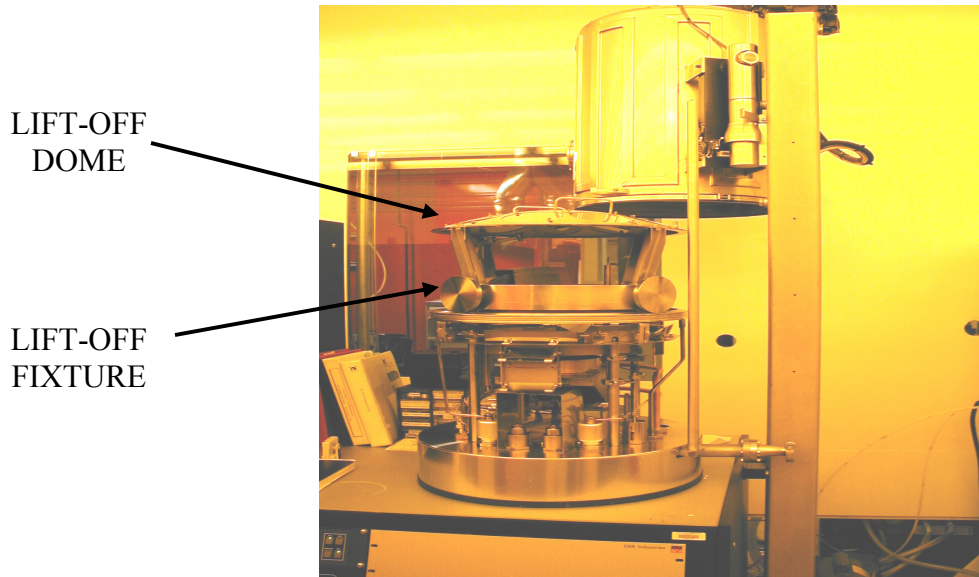


Tighten
Screws

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- vi Place LIFT-OFF FIXTURE and LIFT-OFF DOME onto the surrounding ring of the CHA. Verify the fixture moves easily around the ring. Contact NFC staff if it does not move easily.



- vii Swing bell jar back to the front and re-attach the lower and upper alignment pins. See pictures from set up section for assistance
- viii Load wafers. Fill all empty slots with dummy wafers or holders. Lower the bell jar, pump down the CHA and start your run.

8 Problems/Troubleshooting

- a Contact a staff member if there are any problems changing the fixtures.

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- Equipment Name on Page 1 ('fixturing' changed to "Changing Fixtures")
- Every page ("lift off" changed to "lift-off")
- Step 6, part 'a' on page 1 ('fixturing' changed to 'fixture')
- Step 6, part 'b' on page 1 ("Vent the chamber per ebevap - cha SOP" changed to "Vent the chamber using the instructions found in the "ebevap-cha SOP" ")
- Step 6, part 'b' on page 1 ("...as indicated below" changed to "as indicated on the next page")
- Page 2 (separated the images with a dashed line to help indicate which image the caption is intended for)
- Step 7, part 'b' on page 3 (typographical error: 'removed' should be 'remove')
- Step 7, part 'b', section 'ii' on page 4 ("Once the screws are removed lift off attachment and place on the cart" changed to "Once the screws are removed, lift off the attachment and place on the cart")
- Step 7, part 'b', section 'ii' on page 4 ("...holding it together" changed to "...holding it in place")
- Pages 2, 3, 4, 5 (moved images and captions around to the right pages, separated unrelated images with a dashed line)
- Part 'v' on page 5 ('holder' changed to 'hanger')
- Step 7, part 'b', section 'vi' on page 6 (typographical error: 'attached' should be 'attach')
- Step 7, part 'c', section 'vi' on page 9 (punctuation error)
- Page 9 (added text box and arrow to image to keep consistent with image on page 3)
- Step 7, part 'c' (Added an extra subsection 'viii' as there was no section number assigned to "Swing bell jar back to...." comment)
- Step 7, part 'c', section 'vii' (typographical error: 'reattached' should be 're-attach')