

⚡ T12 Quick Start Guide ⚡

Can't remember a step? Start here!

Things to check before starting your session (working from right to left):

- Camera software off
- All stage coordinates are zero'ed out (X, Y, Z); **THIS IS VERY IMPORTANT FOR THE HEALTH OF THE STAGE! ALWAYS RESET BEFORE REMOVING OR PUTTING IN THE HOLDER.**
- Magnification at SA 1050x
- C2: Over 50%
- Filament ON (Yellow)
- High Tension ON (Yellow)
- Column Valves Closed (Red Bar); Button should be yellow.

Gun/Col vacuum should ideally be at 6 (green bar); DO NOT OPEN COLUMN VALVES IS VACUUM IS ABOVE 10 -> Tell staff

Check that there is **not** a red light on the compu-stage -> PLEASE GET STAFF IF THERE IS!

Aperture "switch" should be facing towards the wall when you start! This means it is **IN**. Aperture should be facing towards wall for M and SA imaging modes, should be facing towards **YOU** for LM! ONLY USE THE APERTURE THAT IS SLIGHTLY OFF TO THE RIGHT FOR THESE ADJUSTMENTS

Pulling out the holder (GO SLOW):

- Using left hand, brace the purple plate of the compu-stage.
- Make a "claw" with your right hand on the black base of the holder.
- Pull out straight (no wiggles) SLOWLY, until first stop is reached.
- Once this stop is evident, rotate **CLOCKWISE** until next stop is reached. DO NOT PULL, ONLY GUIDE THE HOLDER.
- Once second stop is reached, the holder will remain in place. Take a moment to reorient your hands.
- Scoop your right hand around the silver metal "base" of the holder. Make a "thumbs-up". Put your thumb on the purple plate. Use your thumb to gently break the vacuum seal. Your thumb should be the point of force/leverage.
- Gently and carefully guide the holder out of the internal channel. Avoid "clacking" back and forth. Two hands is ideal for this!

Loading the holder:

DO NOT TOUCH THE O-RING. DO NOT TOUCH THE "COPPER" COLOR PART.

- Place the holder in either cradle.
- Claw (on black base) will face up.

****Be extremely careful of the clamp. Have all supplies and grid box near you. DO NOT REACH OVER THE CLAMP. ****

-Use the tool, settle the point in the hole on the base of the "rectangle" on the clamp. **HOLD THE BACK of the holder during this motion.**

- Using stable and gentle force, smoothly guide the clamp to 90 degrees.
- Place your grid right above the circular divot. The side/polarity of a continuous carbon grid doesn't matter since the beam will transverse through the sample.
- Safely lower the clamp.
- Give the holder a quick tap and rotate to make sure that the grid is secure.

Please ensure that the clamp's safety is your priority! Keep it down as much as possible. Don't recover old grids until the clamp is secure!

Putting the holder in (Lock and Key motion):

- Match up small pin on side (near tip) to the silver pin on the purple part of the compu-stage. Both should be at 3:00 (on a clock).
- Push in until you can't go any further. BE GENTLE
- Once in, rotate to 5:00 and give a little extra push. Should feel a soft "squish" of resistance from the O-ring.

ONCE IN - DO NOT WIGGLE, DO NOT TOUCH ANYMORE.

ALLOW PUMP OUT TO CONDUCT.

QUICK CHECK! BLADE NEAR BASE OF HOLDER SHOULD BE AT 10/11:00. THIS MEANS YOU ARE IN THE RIGHT SPOT!

- Wait for pump out to conclude. Red light on stage will turn off. AIRLOCK (red bar in software) will turn back to COL. CLOSED.
- Twist **COUNTERCLOCKWISE** to feed that top "blade" into the hole at 6:00. You are only *guiding* the holder and allowing it to feed in (once that 6:00 point is reached).

Wait for vacuum to recover back to 6. If vacuum hovers above 10 -> GET STAFF.

Quick Start Session:

- Working right to left – Boot up AMT Software
- Click FILE -> Start New Case Study Create/Resume in drop down; File path should remote back to the 'Z' drive. Find your lab.
- You will need to change the Case Name with each grid change. This is saved in the footer of the image.
- Use 'Stage²' menu. Choose the highlighted blue coordinates (X: 0, Y: 0, Z: 80) and hit GO.
- As long as vacuum is healthy (around 6); Open column valves (Yellow button will turn grey).
- Remove screen cover. You should see green on the phosphor screen from the beam.
- Scope will beep at you when switching magnification "zones". If using LM -> aperture switch should be towards you. M and SA -> towards the wall.

If using LM, need to run diffraction mode (button on the right control panel) once back in SA. **DO NOT DO THIS WITH THE CAMERA IN!!!!** Both green circles (one is a very bright green point) need to be concentric. Adjust this with ONLY the side silver knob on the off right aperture. It won't be perfect...but they need to be at least somewhat aligned. Press the diffraction button again to turn off.

-Once your square of interest is found, mag up to slightly beyond 1050x. CLEAR ALL GRID BARS TO AVOID ELECTRON SCATTERING/INCORRECT READINGS! Check that screen amperage is below 5 nA. It's better practice to keep it in the region of ~3 to reduce adjustments while increasing magnification with the camera.

Beam intensity can be changed with the "INTENSITY" knob on the left control panel. No red lights on Fine or Coarse mean that it's in medium mode. Leave it here for beginners. ☺

CLOCKWISE: SPREADS THE BEAM (DIMMER); Lower nA
COUNTERCLOCKWISE: PULLS THE BEAM IN (BRIGHTER) Higher nA

Camera health:

IN LM -> nA for screen reading (bottom right on main monitor screen) MUST BE **BELOW 1 nA**
IN SA -> nA for screen reading MUST BE **BELOW 5 nA**

WHEN THE CAMERA IS IN...watch the red peak of the histogram in the AMT software. DO NOT LET THE PEAK GET ABOVE THE HALFWAY POINT. IDEALLY KEEP IT IN A ¼ REGION!

TAKE THE CAMERA OUT FOR LARGE MAG CHANGES!!! TAKE THE CAMERA OUT FOR DIFFRACTION!! TAKE THE CAMERA OUT FOR RED "BEAM TOO HIGH WARNINGS"!!

-Click large BLUE camera button at the top of the AMT software to engage the camera. It will turn RED when in/active. The first boot up will require you to "Click for Live Image".

-Around 9900 – 13000x, run the Wobbler with the camera in. This can be found in the 'Stage²' menu/window. Use the Z axis buttons on the right panel (near joystick) and adjust in each direction until "tilt" is reduced.

-Click the Wobbler button again to toggle off. Wait for the stage to recenter back to 0-degree tilt.

****Wobbler only needs to be run once per grid! **** Should be the same approximate eucentric height for the entirety of the grid surface.

-Can mag up and focus. Focus button looks like a "top hat". Bottom of "hat" adjusts the degree of focal change (1 = Very Fine; 9 = Extremely Coarse). 3 is a great starter point! Top of "hat" can be rotated back and forth to find focus.

-Take an image by clicking the "file cabinet" icon in the AMT software (on the left side "bar"). A pop up window will occur. Right clicking the large resume button will reinitiate you into "Live Image mode". Left clicking will leave you in a "final image" mode. This is great for measurements! You'll have to save whatever you measure again.

*****WATCH THE BEAM***** Move the track ball to avoid dark corners. Adjust with intensity knob as needed. Move the track ball in the direction of the dark region to correct.

Quick End Session:

-Take out the camera before returning to 1050x (Button is blue). Close camera software (or camera will always be running the background).

-Reset the holder from the 'Stage²' menu. **Make sure that everything returns close to 0.**

-Put mag back at 1050x.

-Leave C2 above 50% (should go up with clockwise intensity)

-CLOSE COL. VALVE BEFORE REMOVING THE HOLDER!!!

PLEASE ZERO OUT THE HOLDER BEFORE PUTTING IN IT/TAKING IT OUT