

GENERAL PROCESS AND OPERATION SPECIFICATION
Nikon Eclipse LV150N Optical Microscope

Operation Spec Nikon Eclipse LV150N Optical Microscope

I. SCOPE

- a. The purpose of this document is to describe requirements and basic operating instructions for the Nikon Eclipse LV150N Optical Microscope located in Bay 4 of the AggieFab Nanofabrication Facility. This microscope is intended for general use to inspect samples. The camera allows both live viewing, and the ability to take images up to 1000x zoom and save them in standard file formats.

II. SAFETY

- a. Be sure to read through this operation document to familiarize yourself with this equipment.
- b. If you are unsure about any procedure or indication while operating this equipment, be sure to contact a staff member for assistance.

III. MATERIALS AND REQUIREMENTS

- a. Sample to inspect.
- b. NIS Software (provided).
- c. PC for driving the NIS software, and storage of user image files (provided).

IV. OPERATION

- a. Initialize the Nikon Eclipse microscope and desktop computer:
 - i. Log into the AggieFab lab kiosk and start your reservation.
 1. The microscope will automatically power on when the interlock is activated. The power light should illuminate.



Figure 1. Power indicator at bottom of microscope and lower-level adjustments.

- b. Ensure the microscope is in the standard configuration:
 - i. The Nikon Eclipse LV150N Optical Microscope has numerous apertures for altering the lighting, polarization, and contrast for viewing samples under specific circumstances. Generally, the microscope should be left in its standard configuration detailed in **Appendix A**.
- c. Start the software:
 - i. Log in to the desktop using your Texas A&M University NetID and password.
 - ii. Once logged in to the desktop, open the NIS 64-bit application shortcut.



Figure 2. Nikon NIS Software App

- d. Load sample:
 - i. To help with loading, the microscope's stage can be freely manipulated by squeezing and holding the small silver levers on the right side of the stage.
 - ii. Change the microscope's physical magnification to the 5x objective. Carefully place the sample onto the stage, taking care to ensure that the sample does not collide with the objective lens.

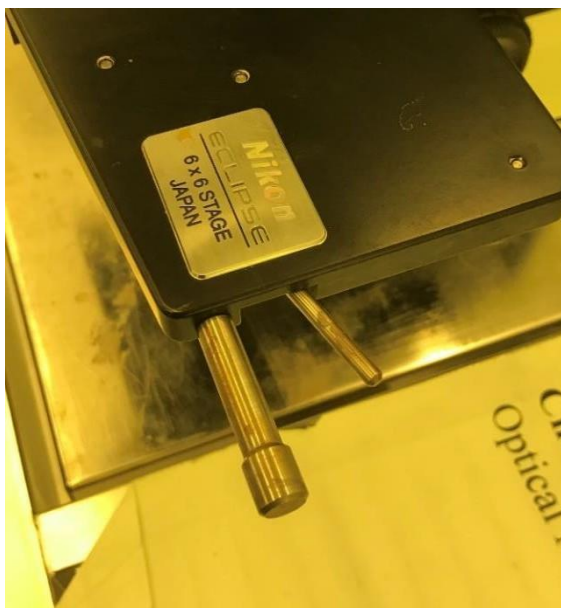


Figure 3. Stage levers.

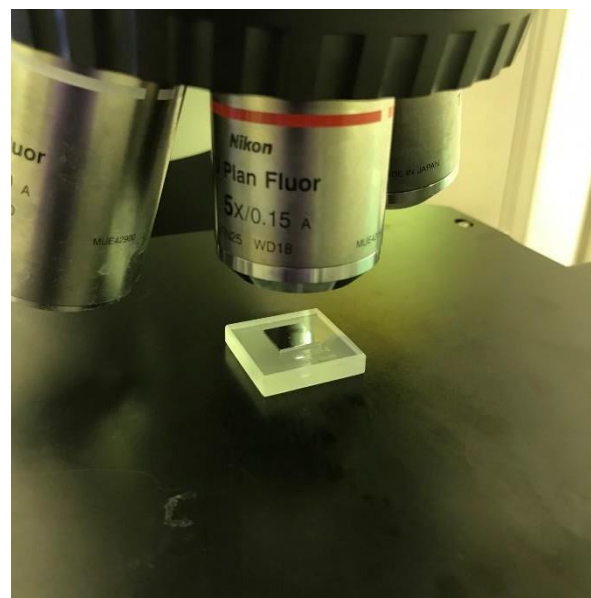


Figure 4. Proper sample offset from object lens.

- iii. At the top right corner of the software window, select the soft button that corresponds to the physical magnification. This allows the software to interact with the microscope's physical set-up and provide image scaling, detailed in later steps.

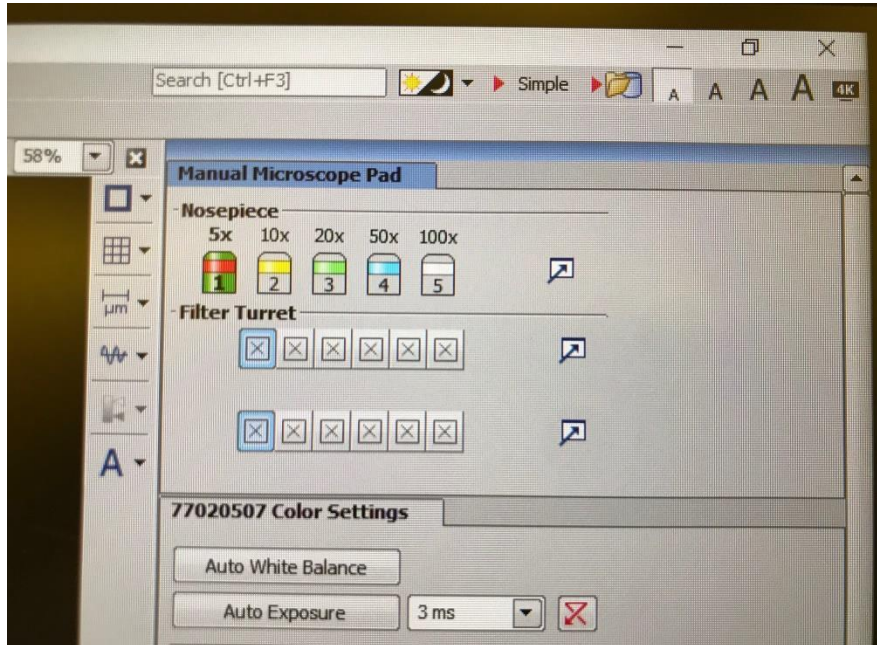


Figure 5. NIS software soft buttons.

- iv. If a video display of the microscope's view field is desired, pull out on the knob located near the top of the microscope. This will allow a live stream of the field through the NIS software.
- v. Conversely, if a video display is not desired, leave the knob pushed in and use the microscope normally.

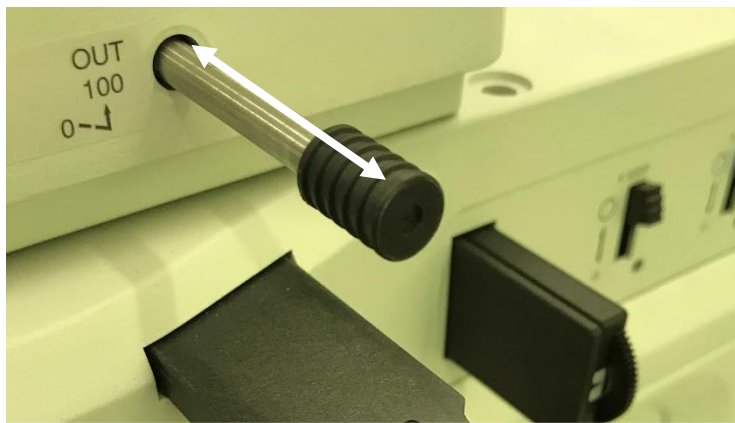


Figure 6. Video feed knob.

- vi. To initiate the live video feed to the NIS software's display, click on the green "play" soft button in the toolbar.

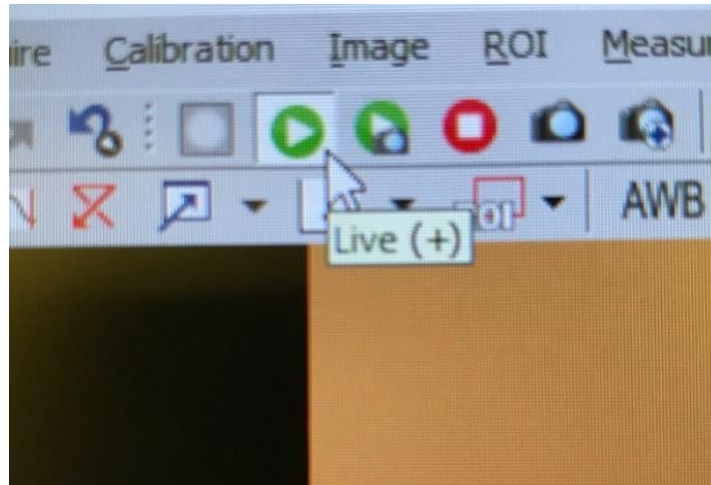


Figure 7. NIS software play button.

- e. Adjusting the Stage:
 - i. The microscope's stage has five main adjustment knobs.
 1. Coarse adjustment in the z-direction (focus).
 2. Fine adjustment in the z-direction (focus).
 3. Fine adjustment in the x-direction.
 4. Fine adjustment in the y-direction.
 5. Brightness adjustment (See Figure 1).
 - ii. **DO NOT** adjust the torque knob.

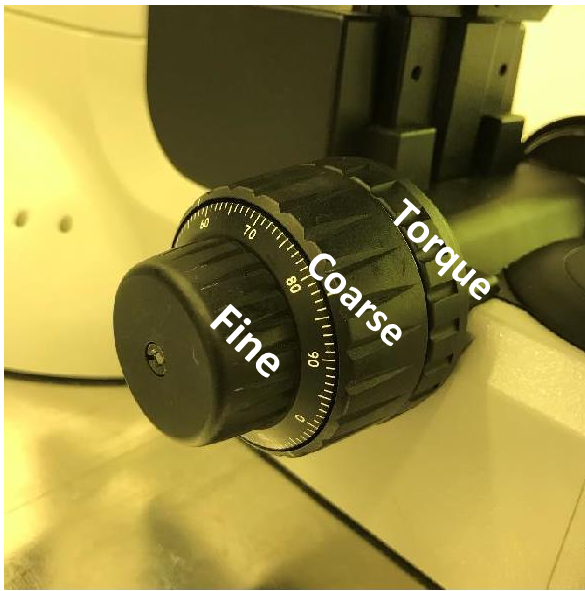


Figure 8. Coarse and fine focus knobs.

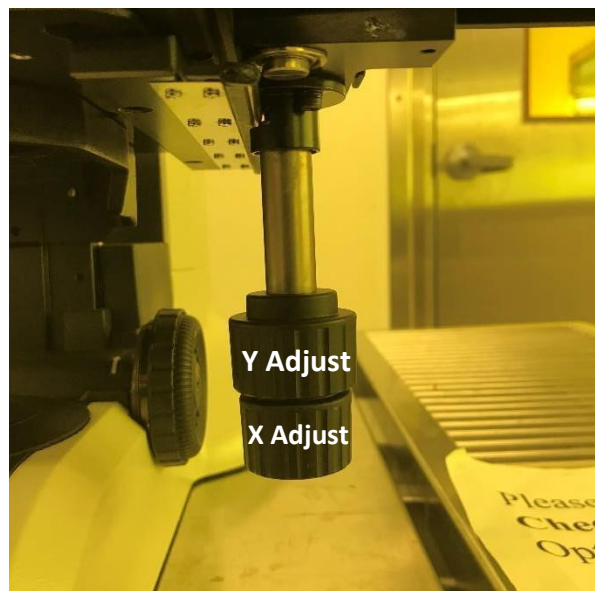


Figure 9. X and Y stage adjustment knobs.

- f. Adjust the picture (optional):
 - i. Under “Color Settings” sidebar, adjust values as you see fit for the photo.
However, **DO NOT USE AUTO WHITE BALANCE!**

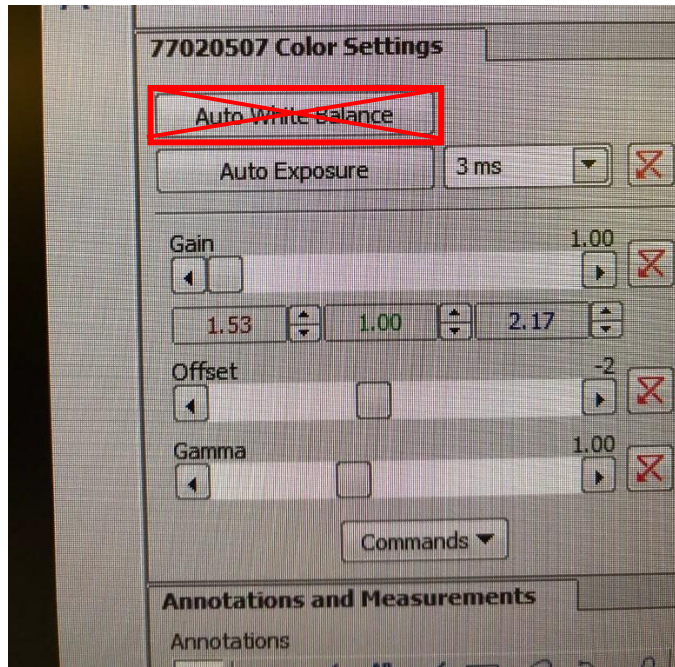


Figure 10. Color settings on NIS software.

- g. Capture, edit, and save an image:
 - i. When to ready capture an image, click the camera icon located on the toolbar.

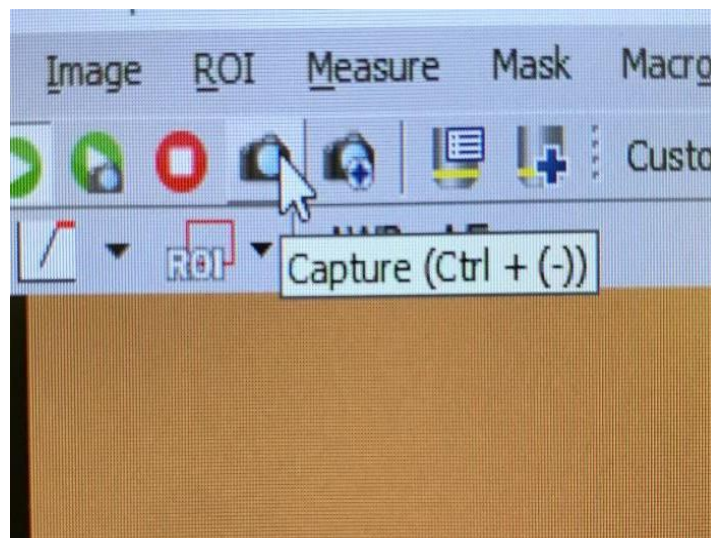


Figure 11. Color settings on NIS software.

- ii. Take measurement and make annotations on the image.
 - 1. Use the “Annotations and Measurements” sidebar perform various actions on the captured image.

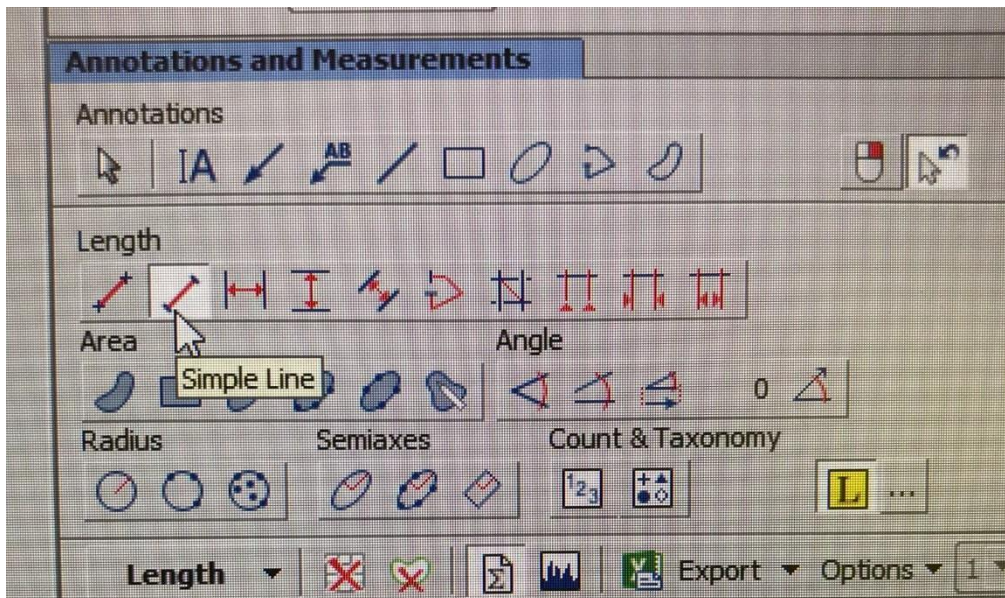


Figure 12. Annotations and measurements sidebar.

- 2. To display a true scale on the captured image, click on the “view” tab in the main toolbar, hover over “Layers”, then select “Scale”. The scale bar can be moved on the image by left-clicking and dragging to a desired location, then “burned” into the image by right-clicking on the scale bar and selecting “Burn Scale”. Images on next page.

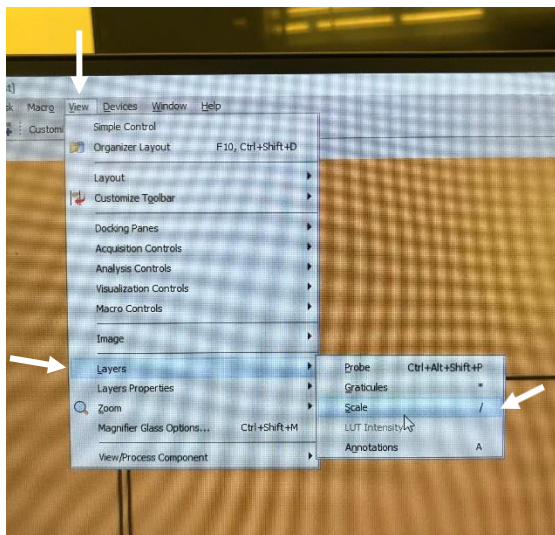


Figure 13. How to overlay a scale bar.

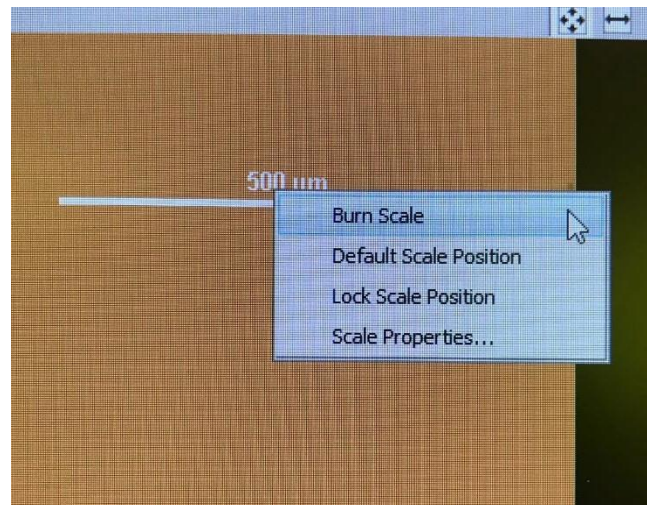


Figure 14. Burning the scale bar to the image.

- iii. To save the image, click on “File” in the main toolbar, then “Save As”. Choose the appropriate file time. It is very beneficial for users to create their own folder to save images to maintain organization.

- h. Close the program and set it up for the next user:
 - i. Before closing everything, be sure that you have saved all your photos.
 - ii. Close the NIS software, sign out of the PC, turn off the monitor, and finish your reservation in iLab.
 - iii. Ensure the microscope's apertures are returned to the standard configuration detailed in **Appendix A**.

Notes:

There is an internal lens that provides an additional 10x magnification to samples inspected by the microscope. Consequently, the image provided is 10x the selected objective. This is how the microscope is able to achieve 1000x overall magnification.

At any time during the process above, the sample may be set up for normal viewing through the microscope binocular eyepieces. Use normal procedure to set stage location, focus, selection of objective lens, and lamp brightness. Set the microscope filter in the desired position - normal bright light for most photographs.

Keep in mind that the focal lengths for the eyepiece and the camera may be different.

It is recommended to use a personal flash drive to store important images. Images can be saved in a personal folder on the PC, but this will not guarantee the safety of your work. The desktop computer is connected to the Texas A&M network, so you may also save work to the cloud or send emails.

If you are interested in learning a few tips and tricks like video recording, the manual is available under "Help" in the top toolbar, and as a pdf file on the desktop. Advanced actions will require this.

V. **QUALITY**

- a. This microscope is intended for general purpose use and may be used to inspect a wide variety of samples, wafers, substrates, and other materials for AggieFab users. General precautions are expected to be used in the handling of samples to ensure that cleanliness is maintained, and cross-contamination is minimized among users.

VI. **SIGNATURES AND REVISION HISTORY**

- a. Author of this document: C. J. Karber
- b. Author Title or Role: Student Worker
- c. Date: 4/12/2021
- d. Revision Notes: N/A

Approvals:

Technical Manager Signature: Sandra G Malhotra

Date: 4/12/21

Revision History:

Revision	Author	Date
Original Issue	C. Karber	4/12/2021
Rev A		
Rev B		

Operation Spec Nikon Eclipse LV150N Optical Microscope

Rev C		
-------	--	--

Appendix A – Standard Configuration

The Nikon Eclipse LV150N Optical Microscope has numerous apertures for altering the lighting, polarization, and contrast for viewing samples under specific circumstances. This SOP covers general viewing conditions, therefore settings, conditions, or fields pertaining to specific sample types should be thoroughly researched in the manufacturer’s manual or the NIS software.

The images below show the standard configuration of the microscope’s apertures.



Figure 15. Apertures located at the back of the microscope. Note the even spacing.

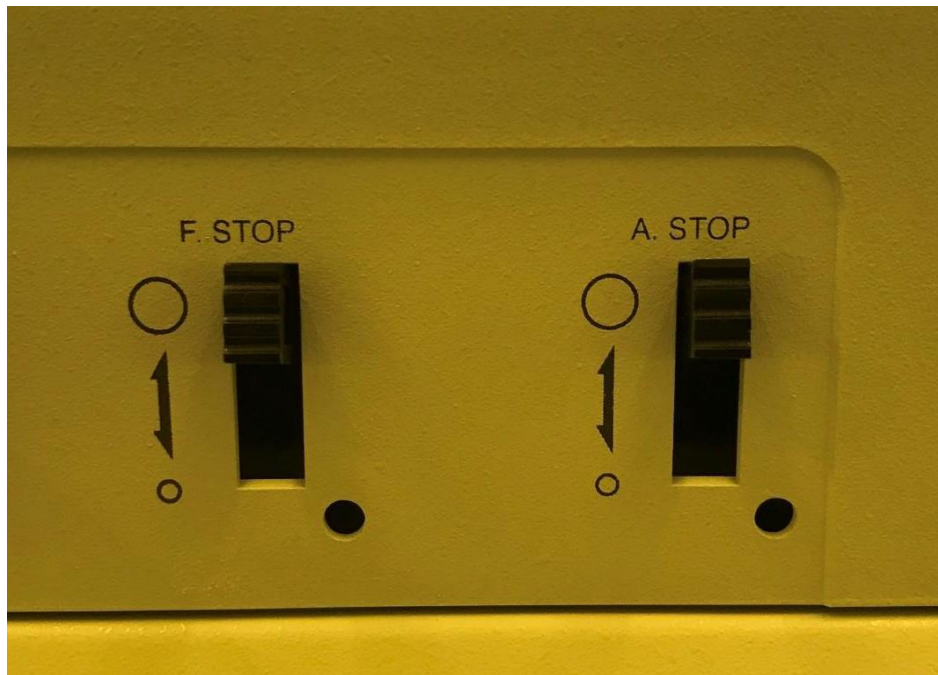


Figure 16. Apertures located on the right side of the microscope. Both switches are up.



Figure 17. Aperture located on the right side of the microscope above the objective lenses. This is in a middle position that the aperture “clicks” into.

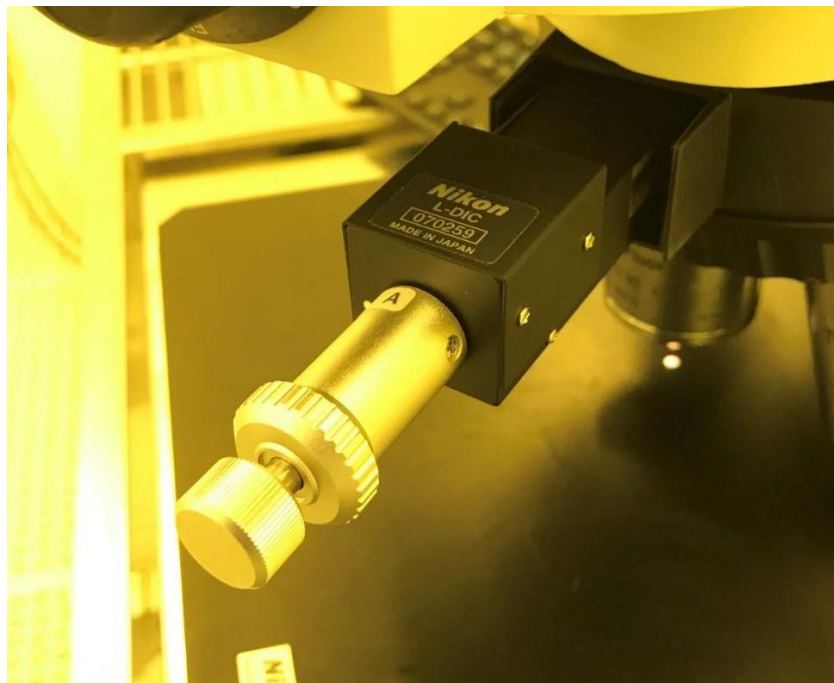


Figure 18. L-DIC aperture located immediately above the objective lenses. Note how the objective is pulled out slightly.

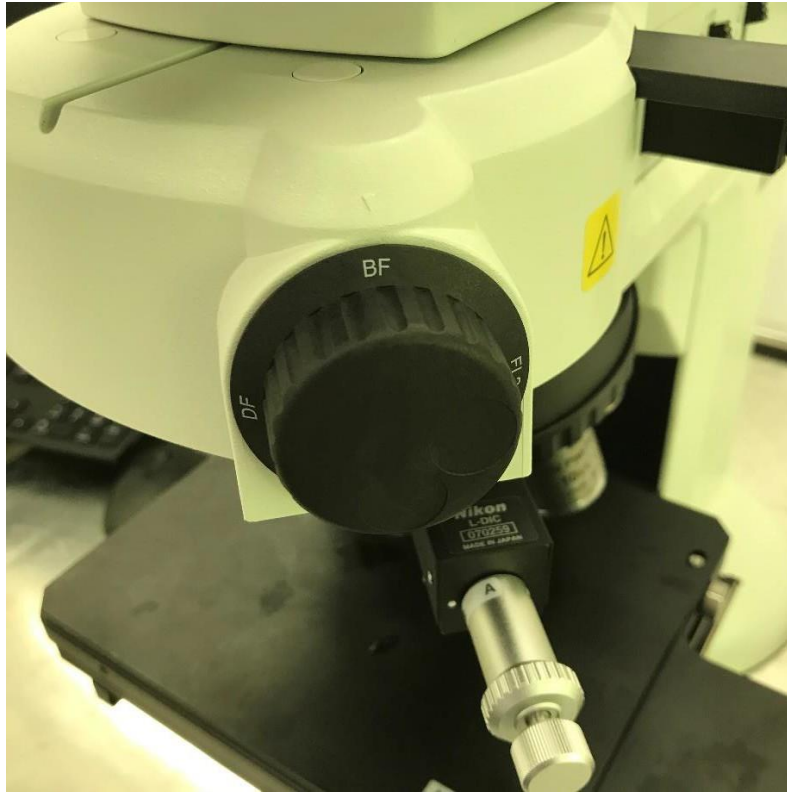


Figure 19. Bright field / dark field adjustment knob. Standard positions is "BF".