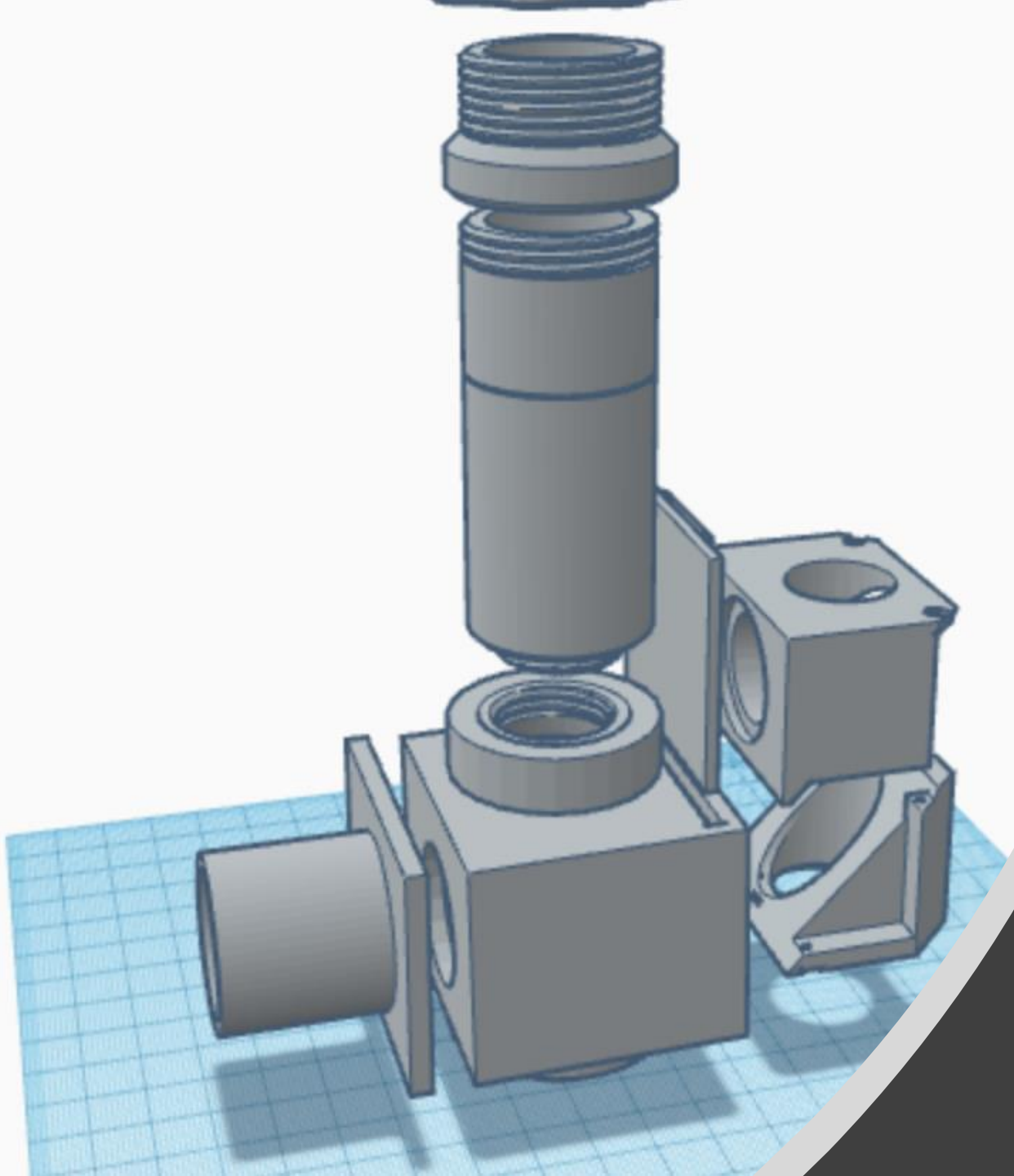
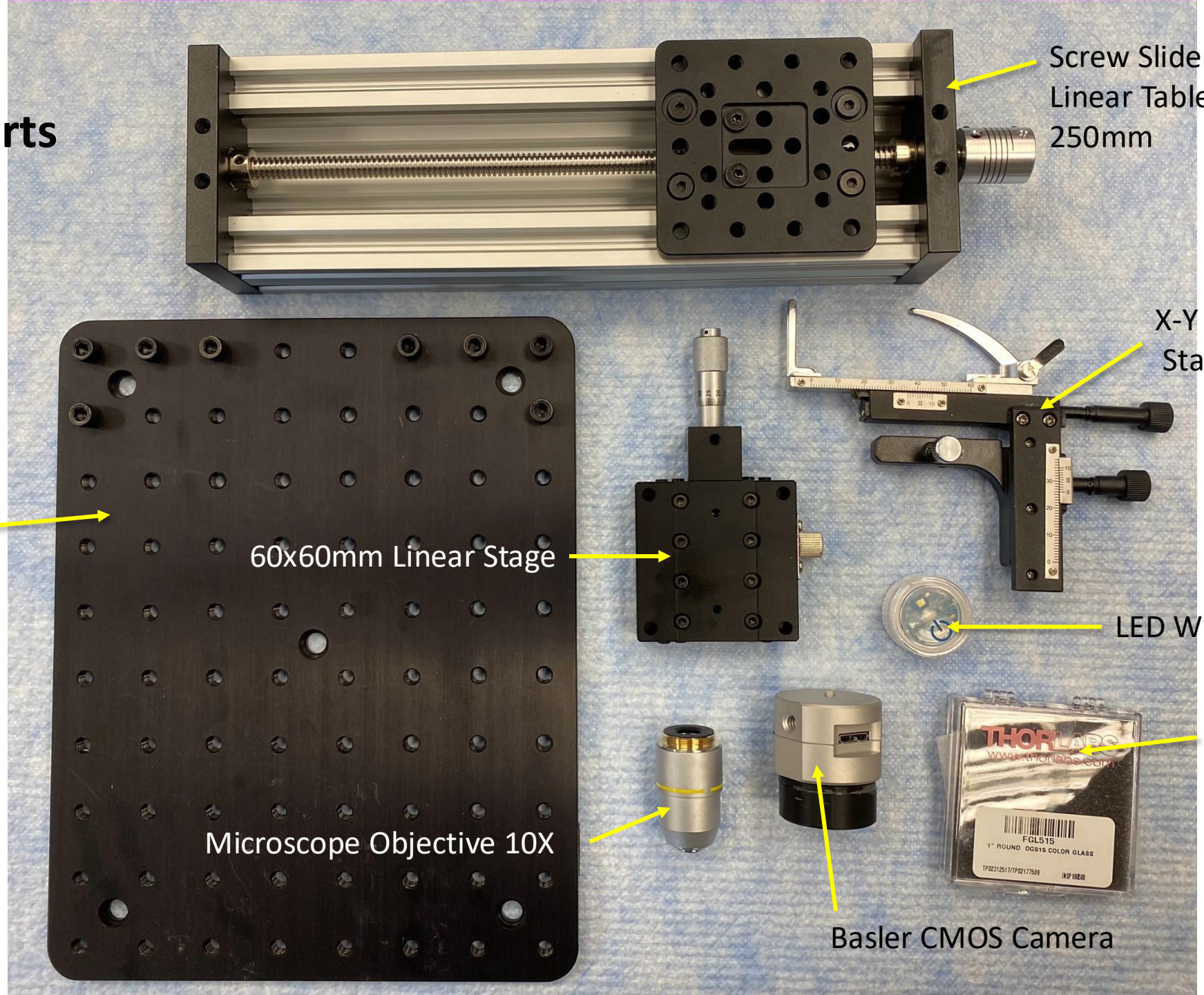


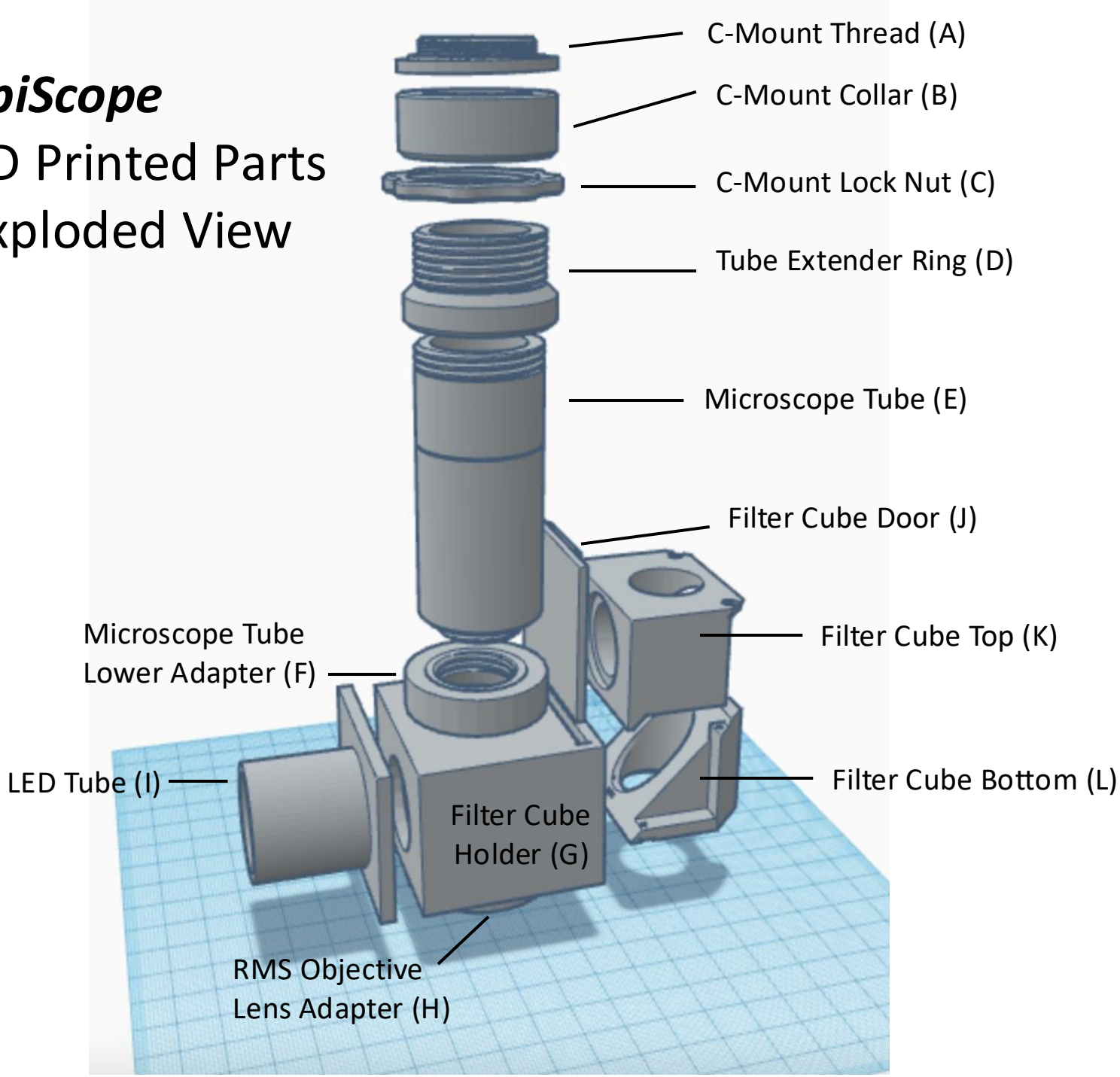
Building the EpiScope

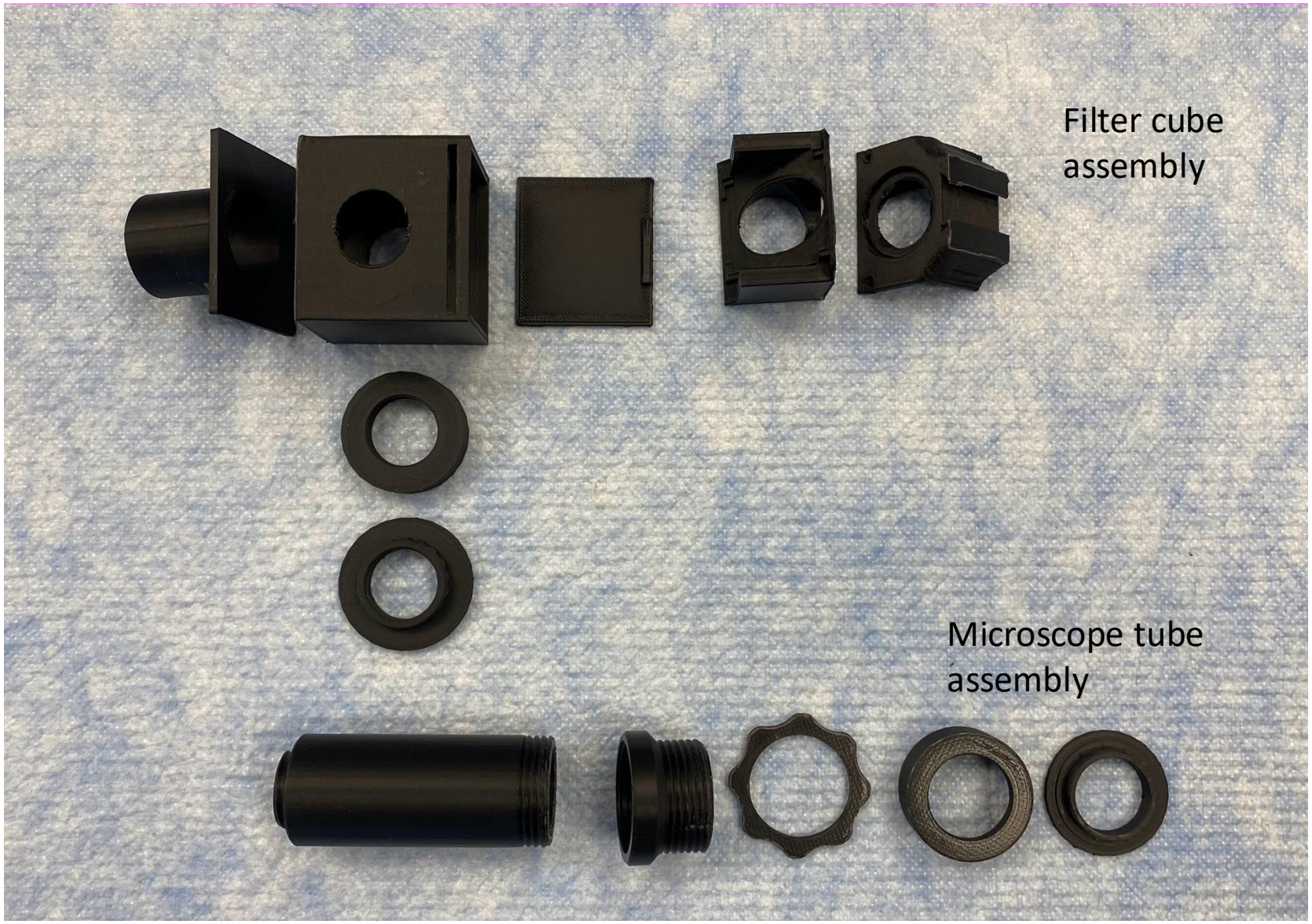
Parts Needed: Mechanical Parts



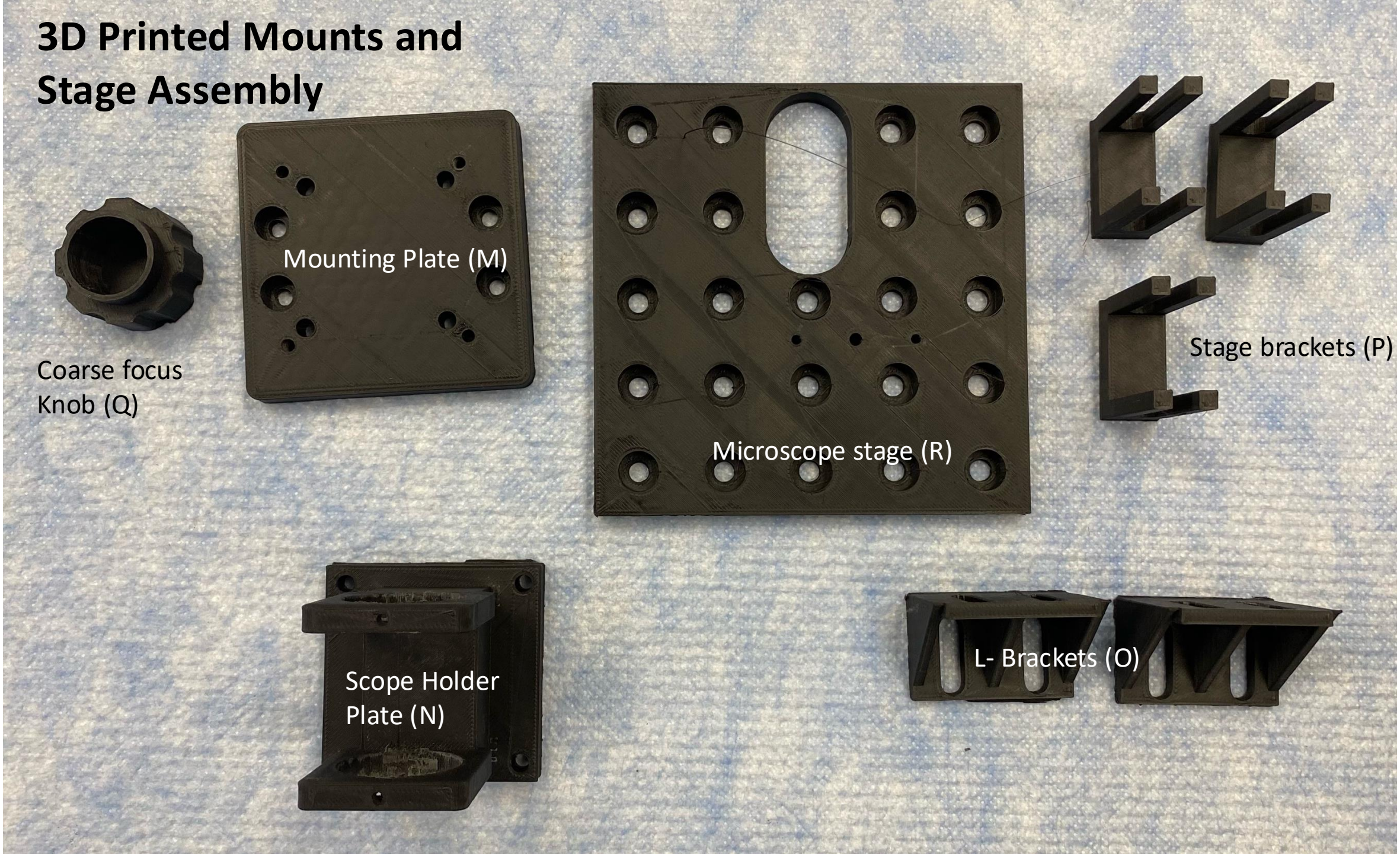
Tools Needed:

EpiScope
3D Printed Parts Exploded View



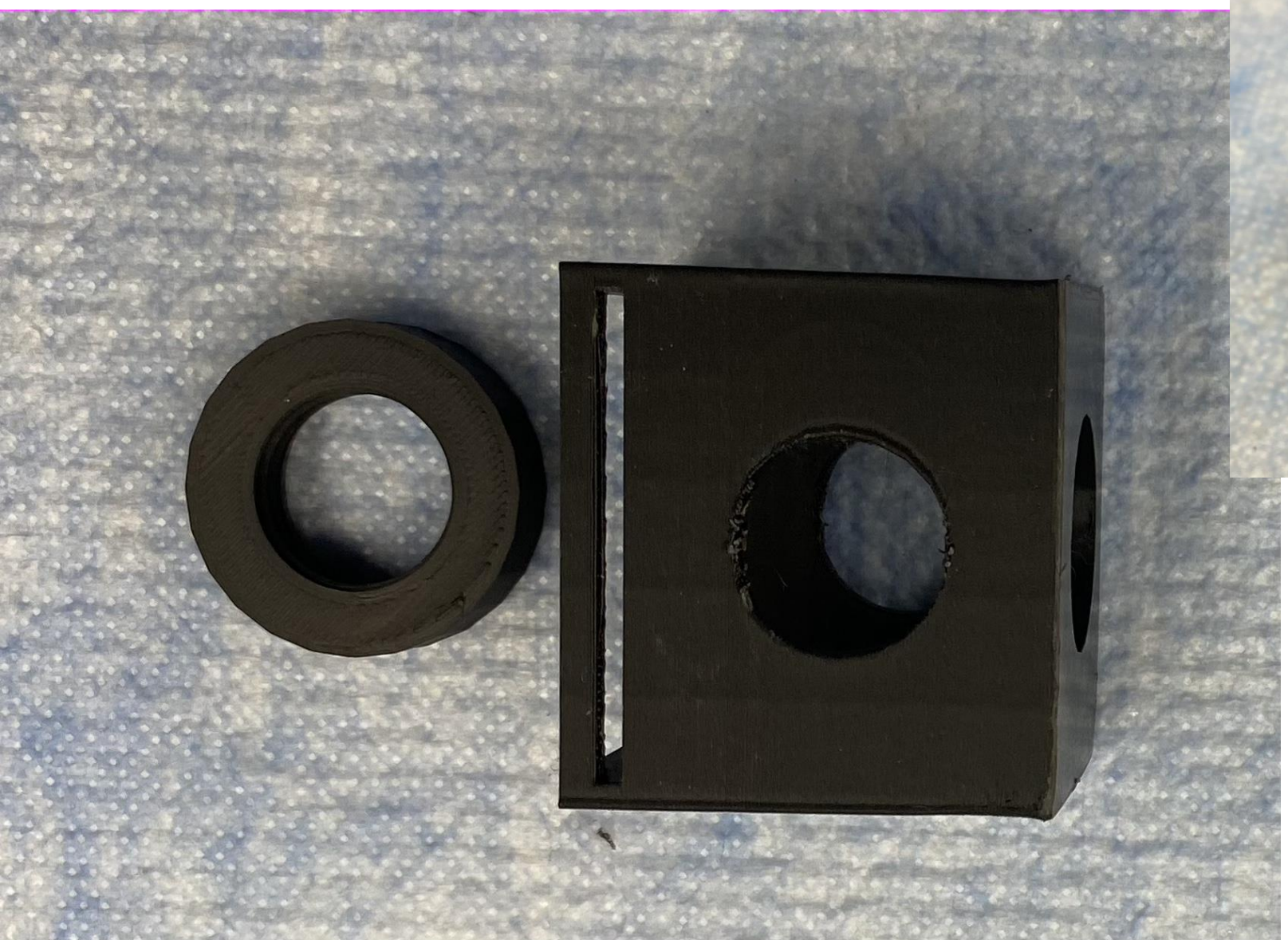

Filter cube
assembly
Microscope tube
assembly

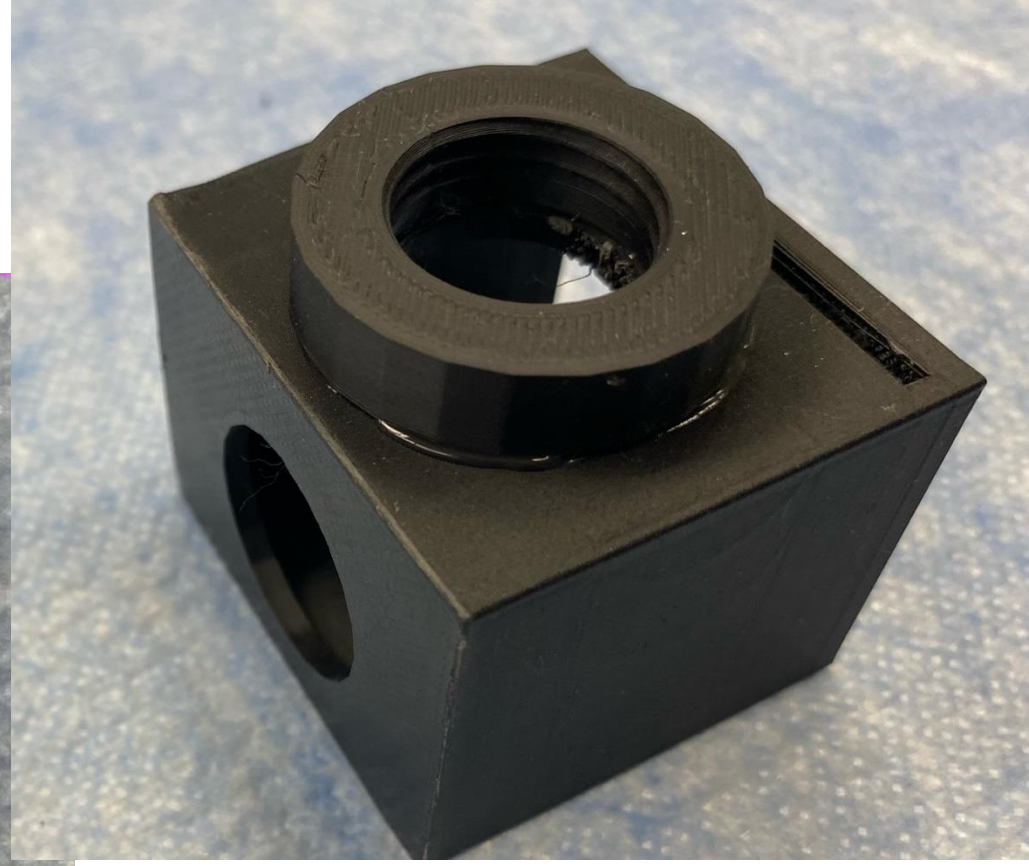
3D Printed Mounts and Stage Assembly



1: Epoxy parts A and B together (part A sits onto of part B)

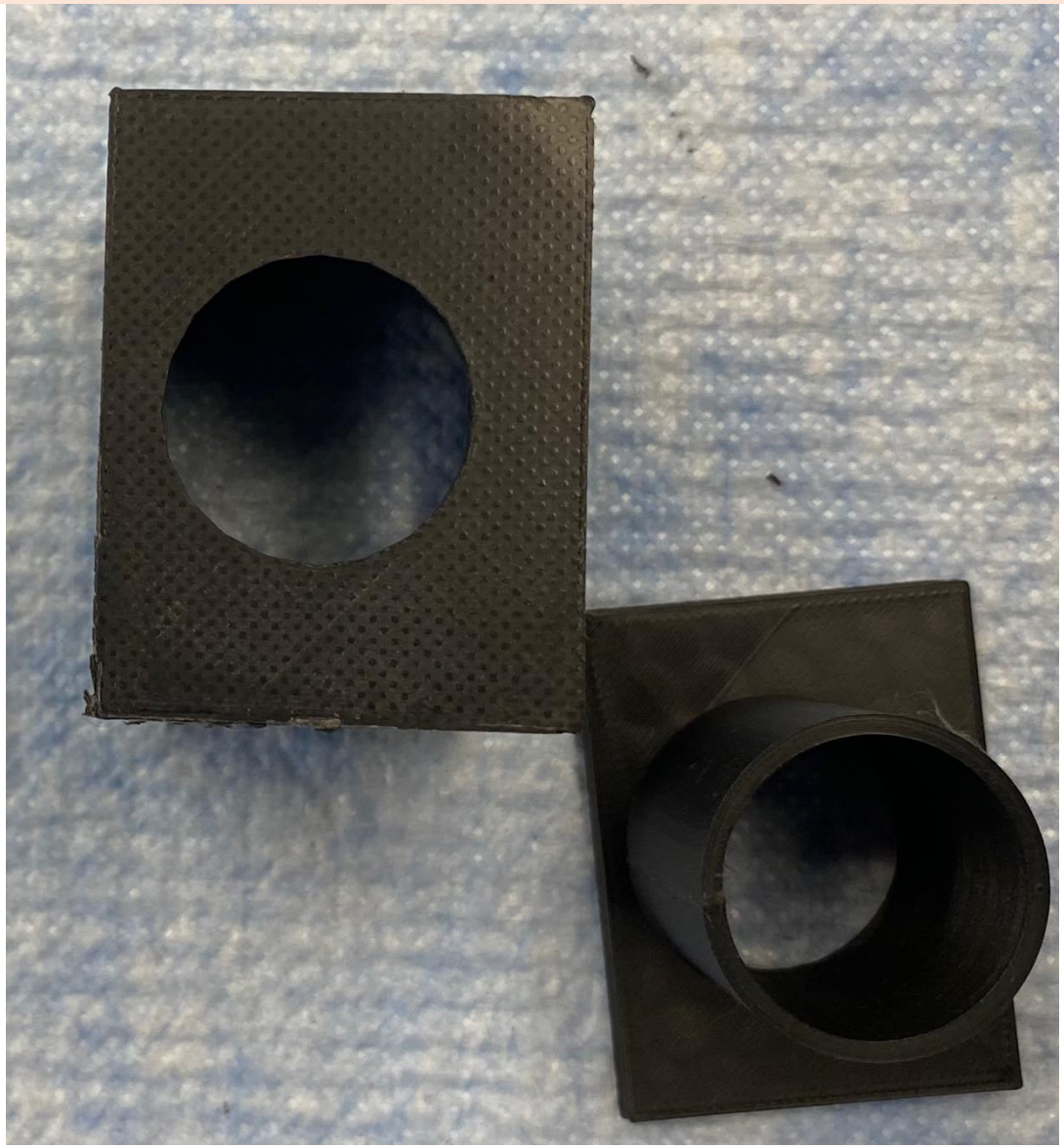
Step 2: Epoxy scope tube lower adapter (F) to top of filter cube holder (G)

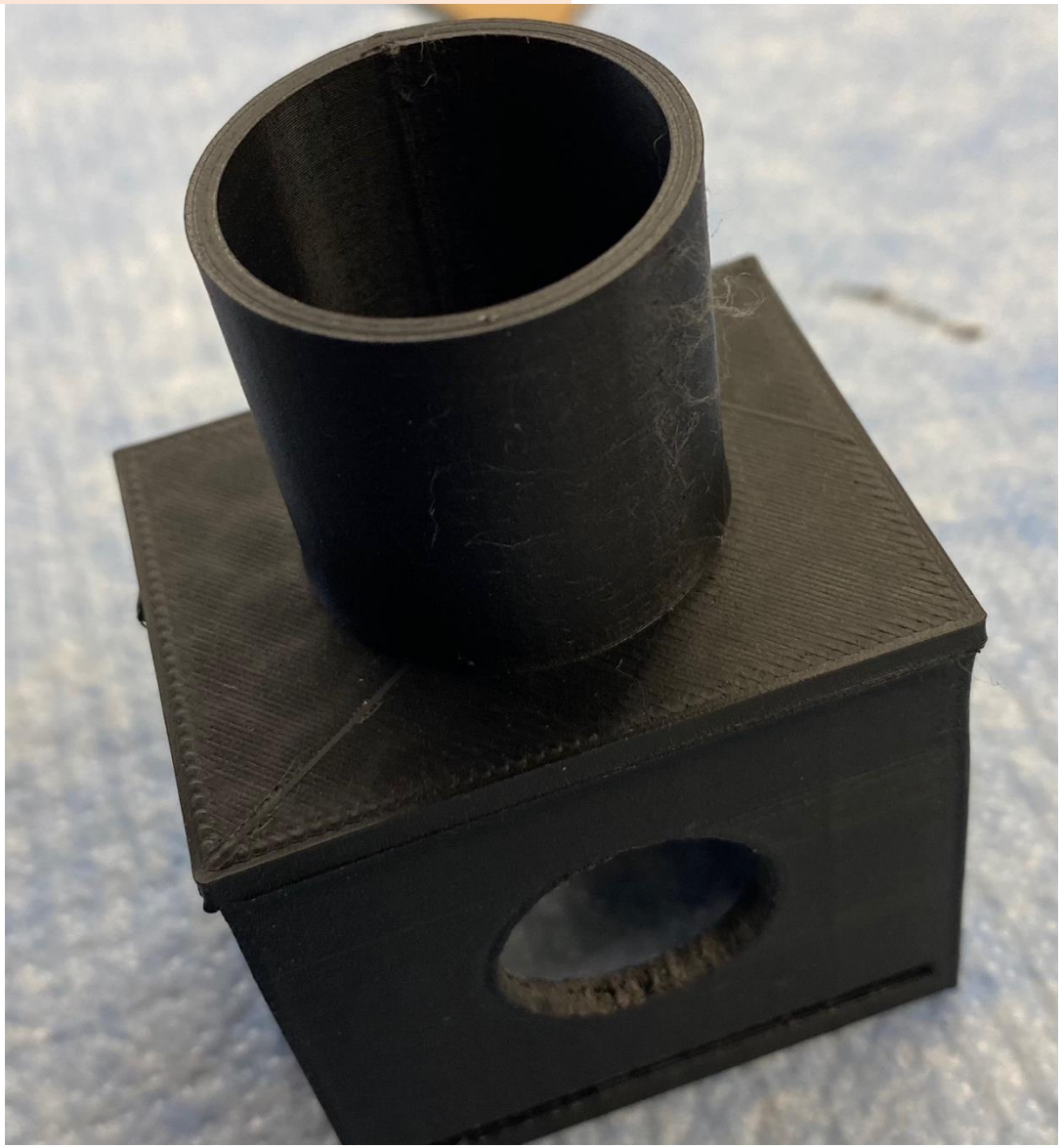




Check orientation of the threads Before epoxying – threads should be on the top

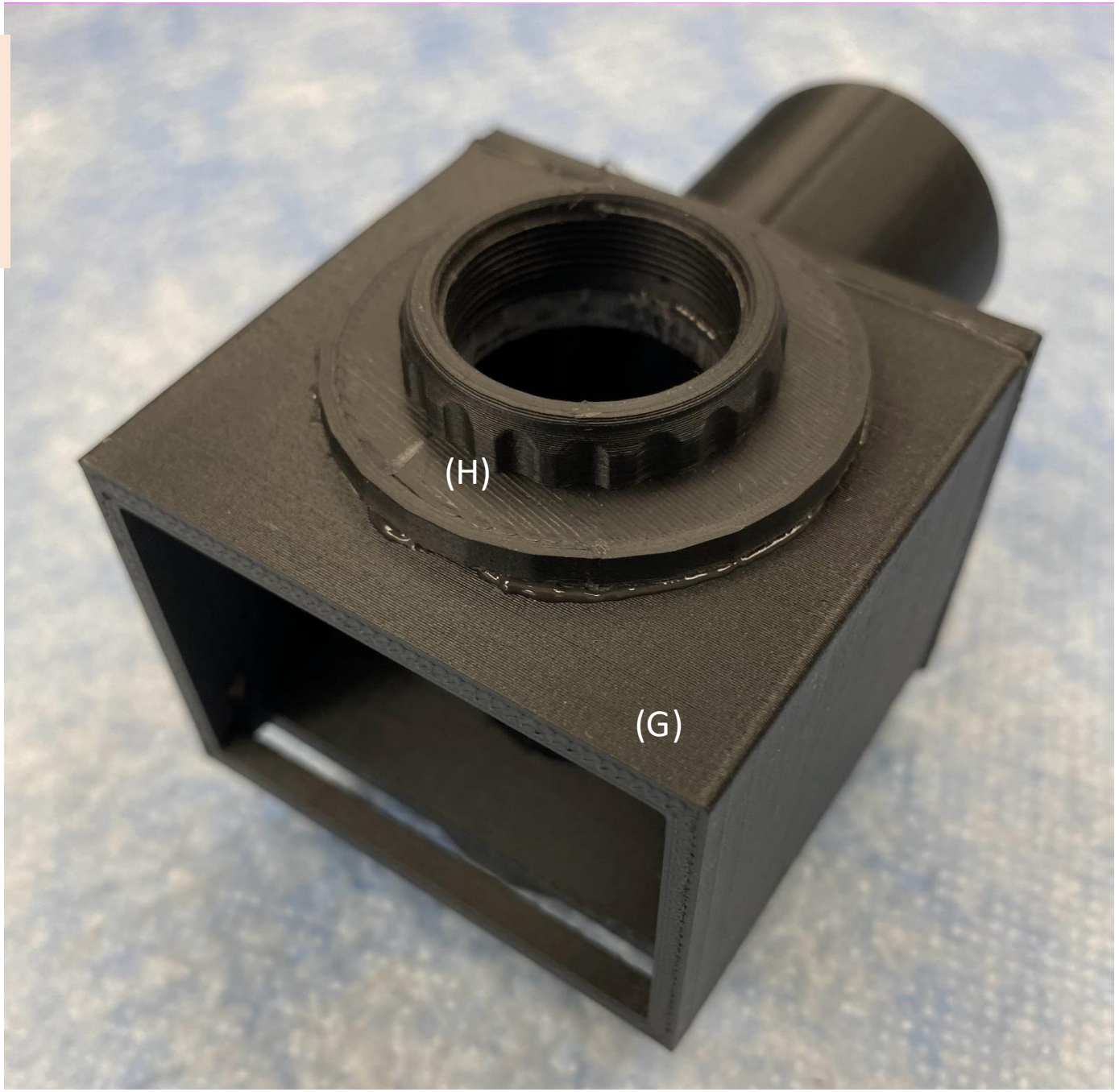
Step 3: Epoxy the LED tube (I) to the filter cube holder (G)



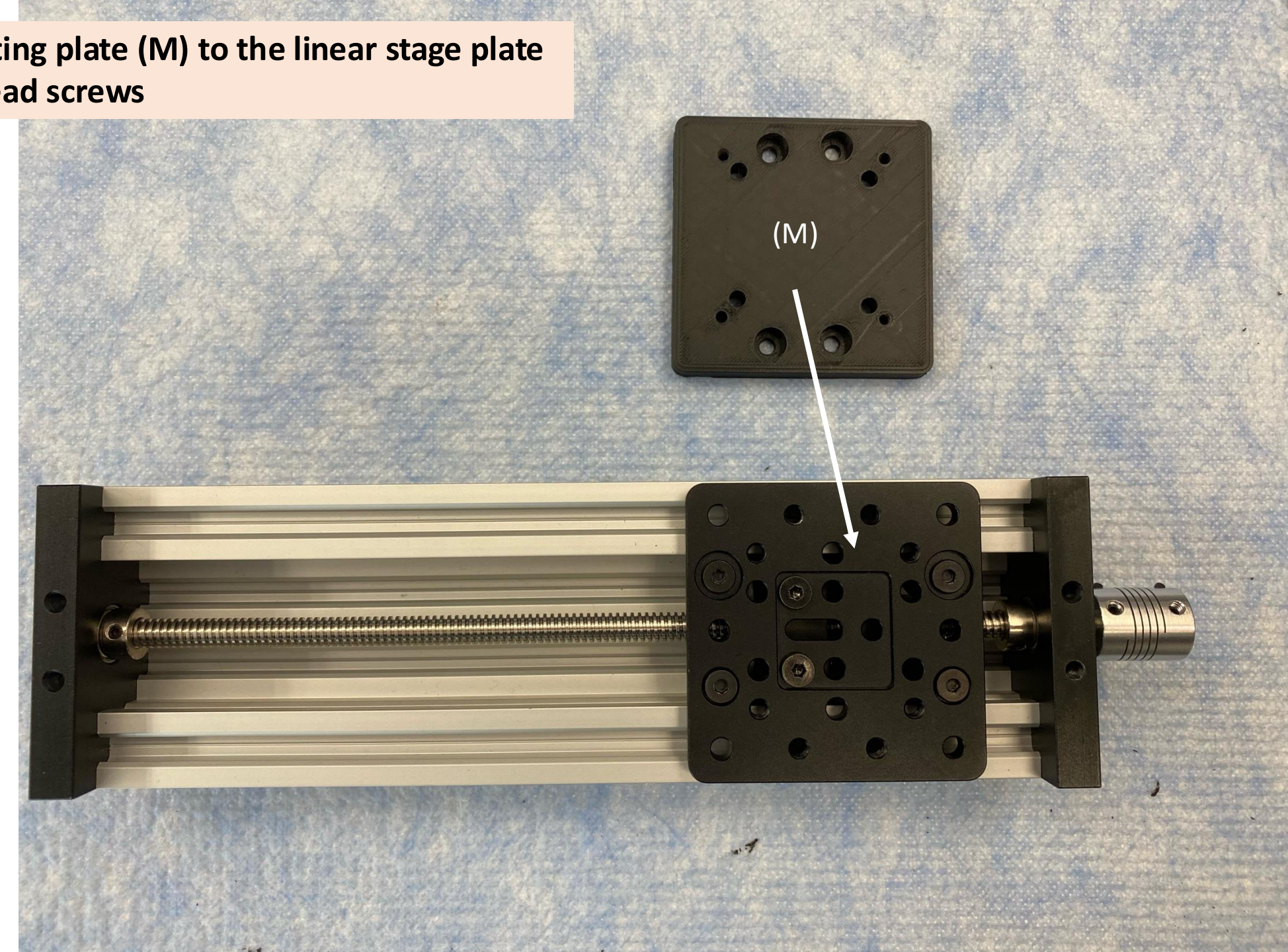


Check orientation of the holes

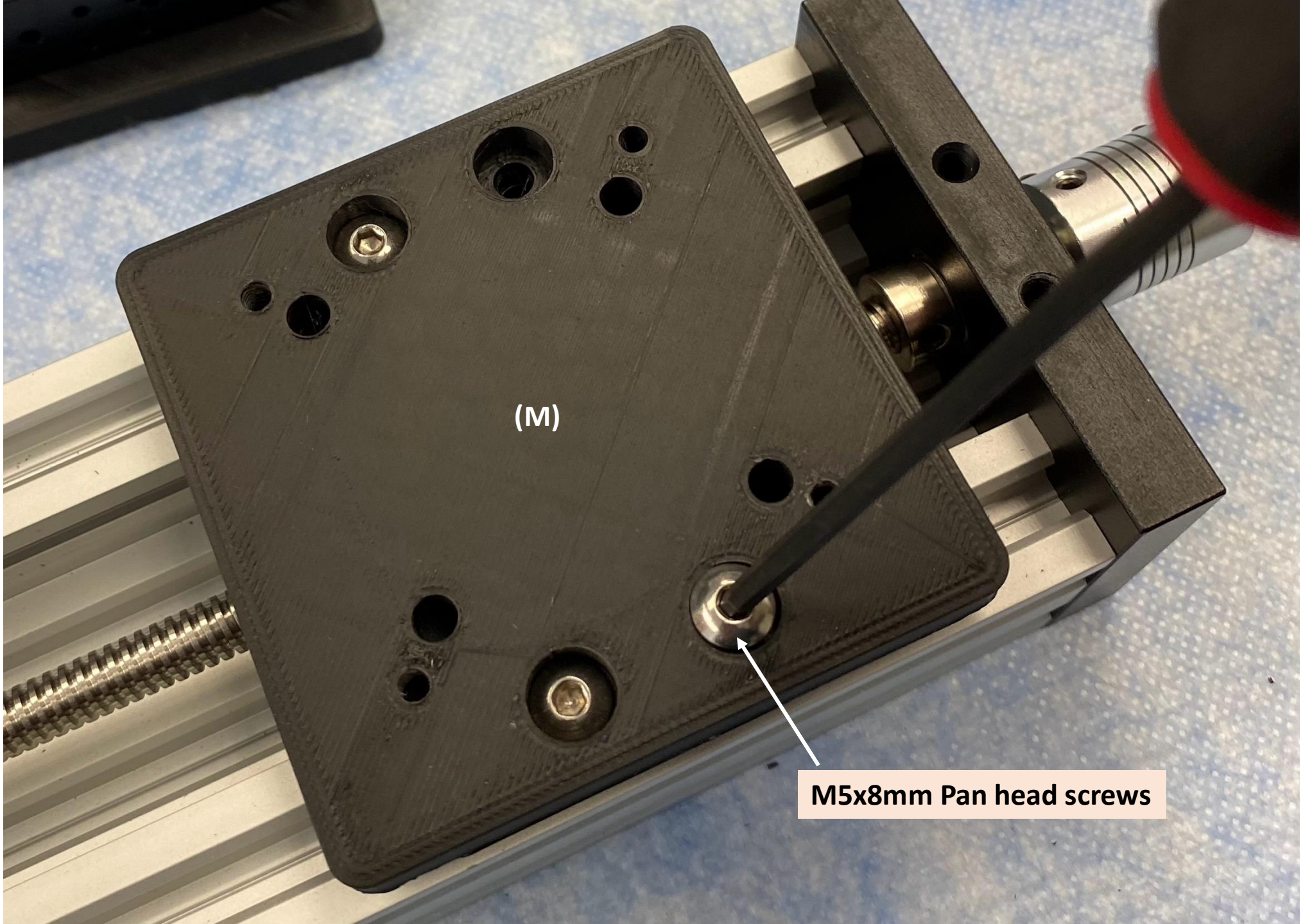
Step 4: Epoxy RMS objective lens adapter (H) to the bottom of the filter cube holder (G)



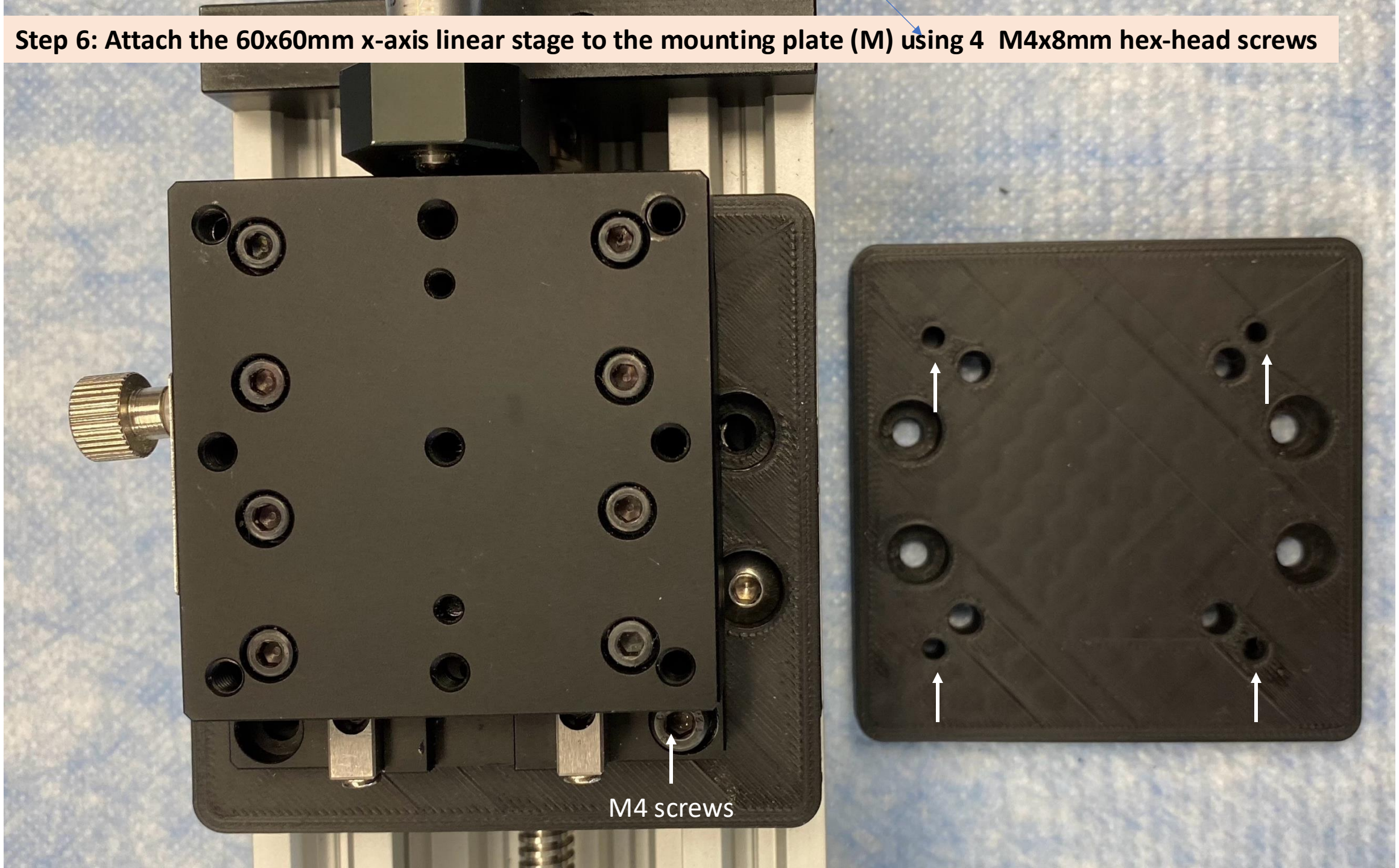
Step 5: Attach the Mounting plate (M) to the linear stage plate using 4 M5x 8mm pan head screws



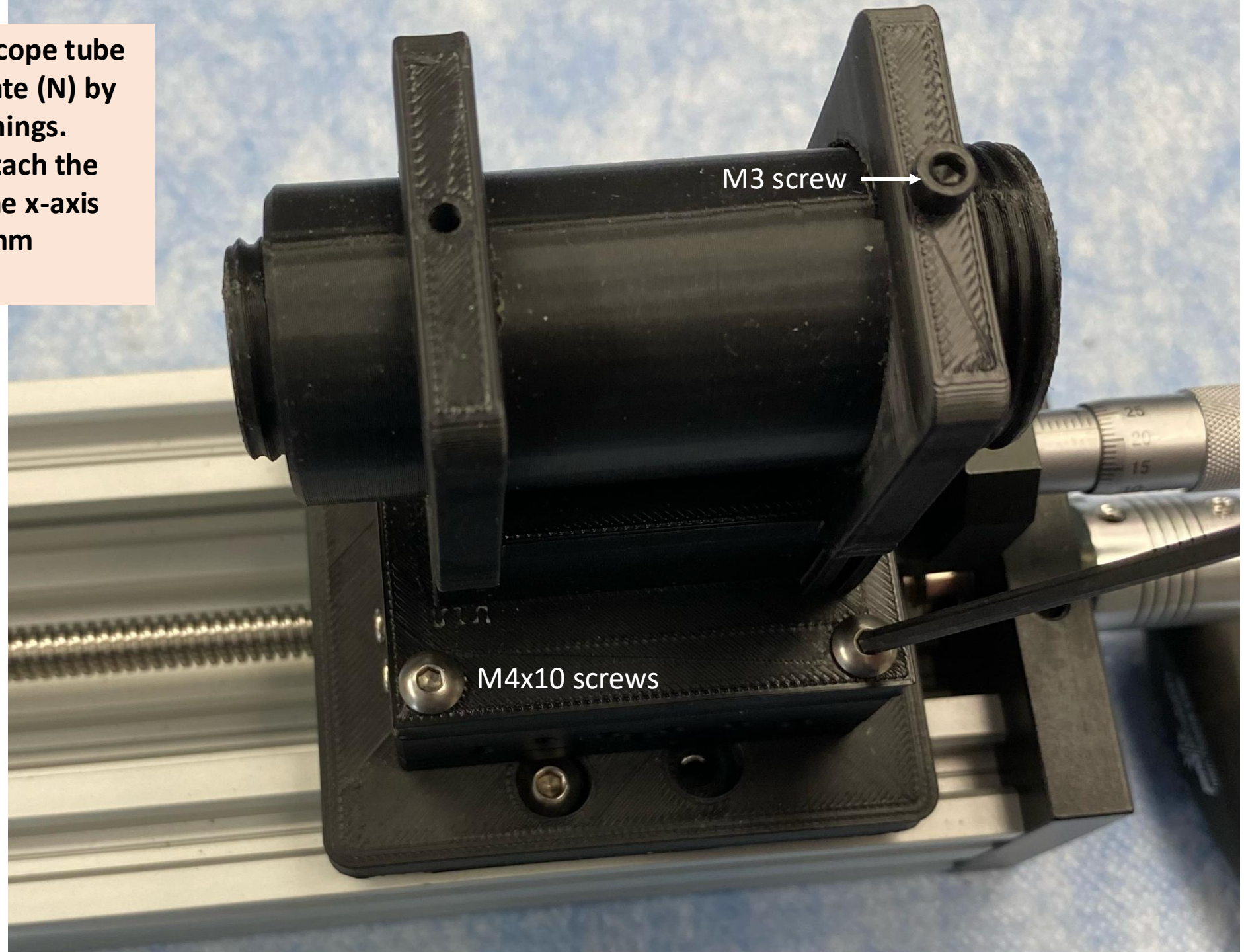
Note the orientation of the holes on plate M

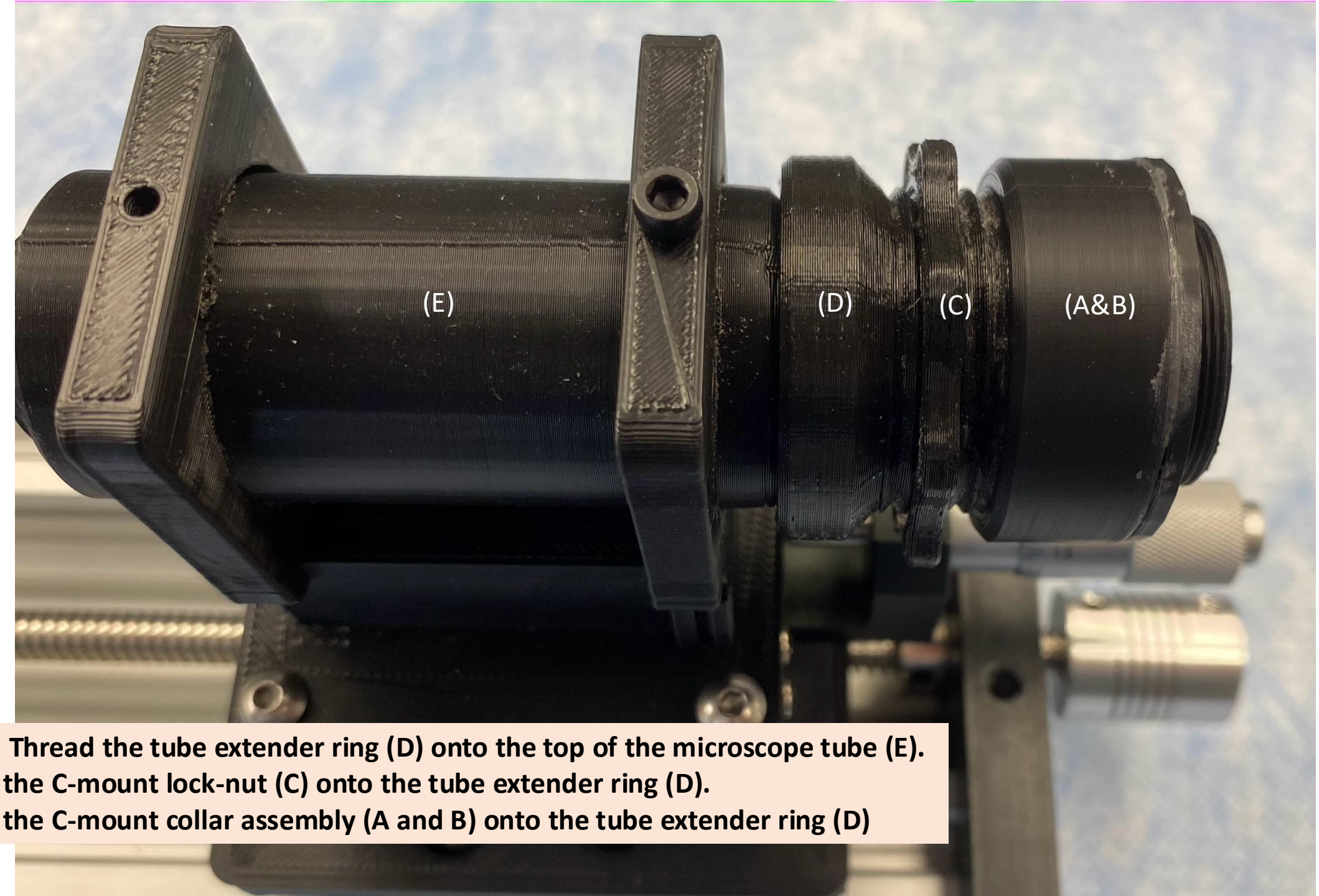

(M)
M5x8mm Pan head screws

Step 6: Attach the 60x60mm x-axis linear stage to the mounting plate (M) using 4 M4x8mm hex-head screws



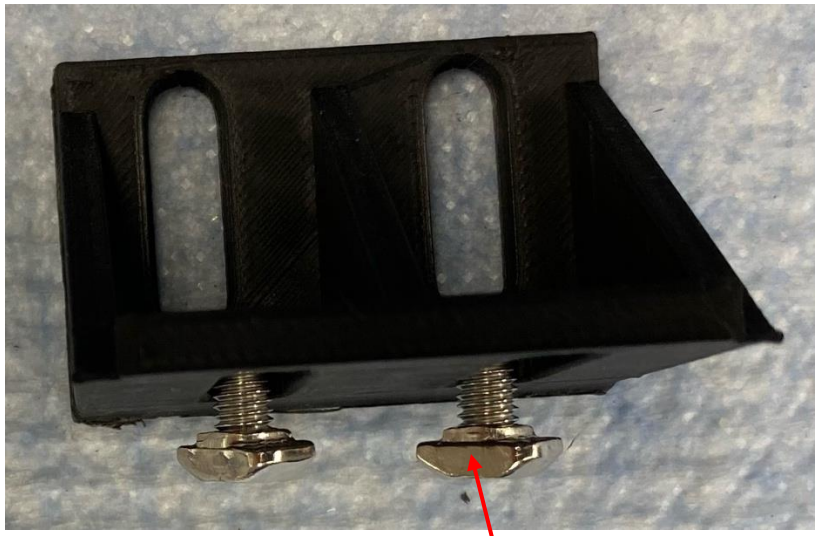
Step 7: Attach the microscope tube (E) to the scope holder plate (N) by sliding it through the openings. Secure with M3 screw. Attach the scope tube assembly to the x-axis liner stage with 4 M4x10mm pan head screws

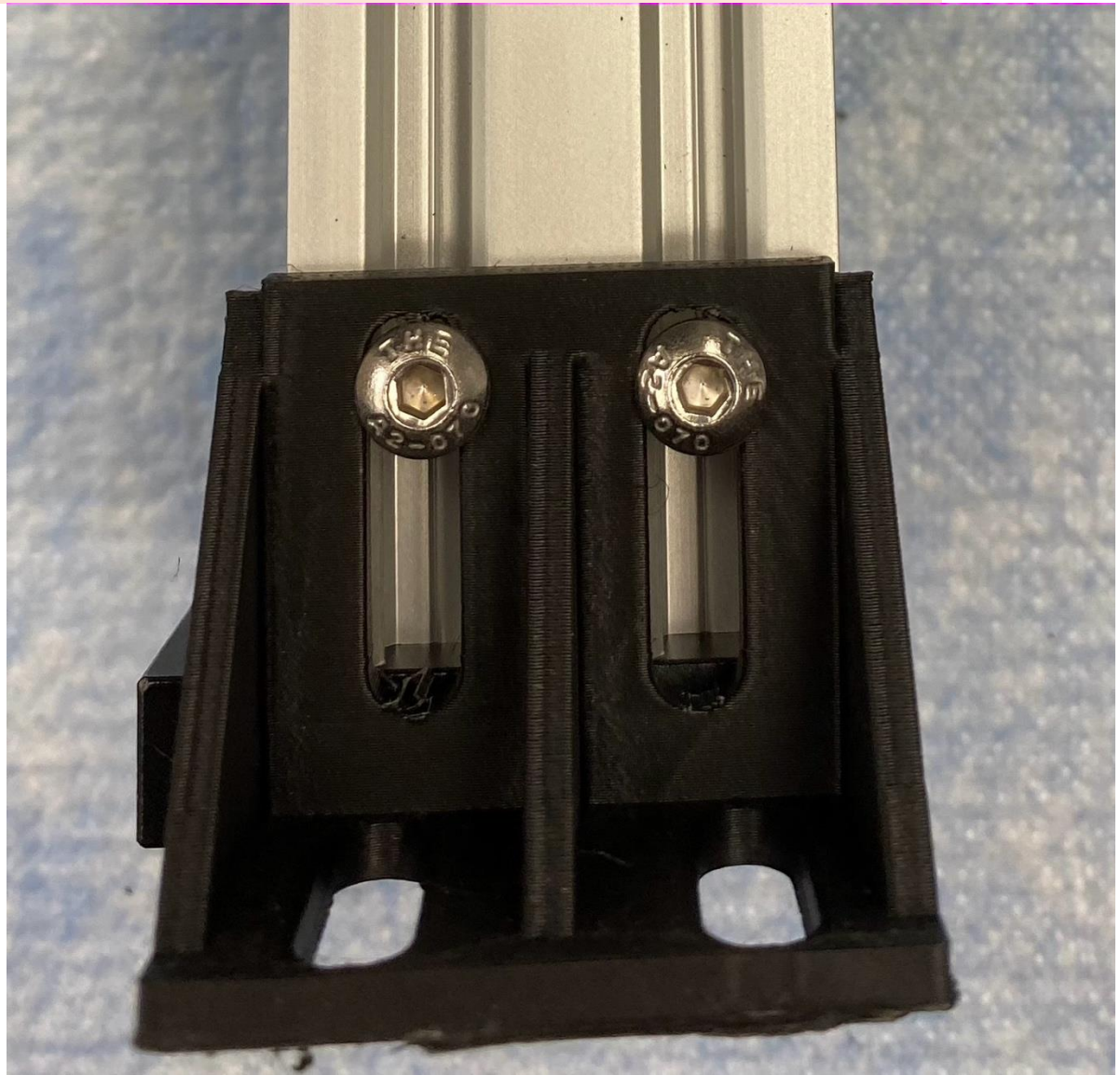




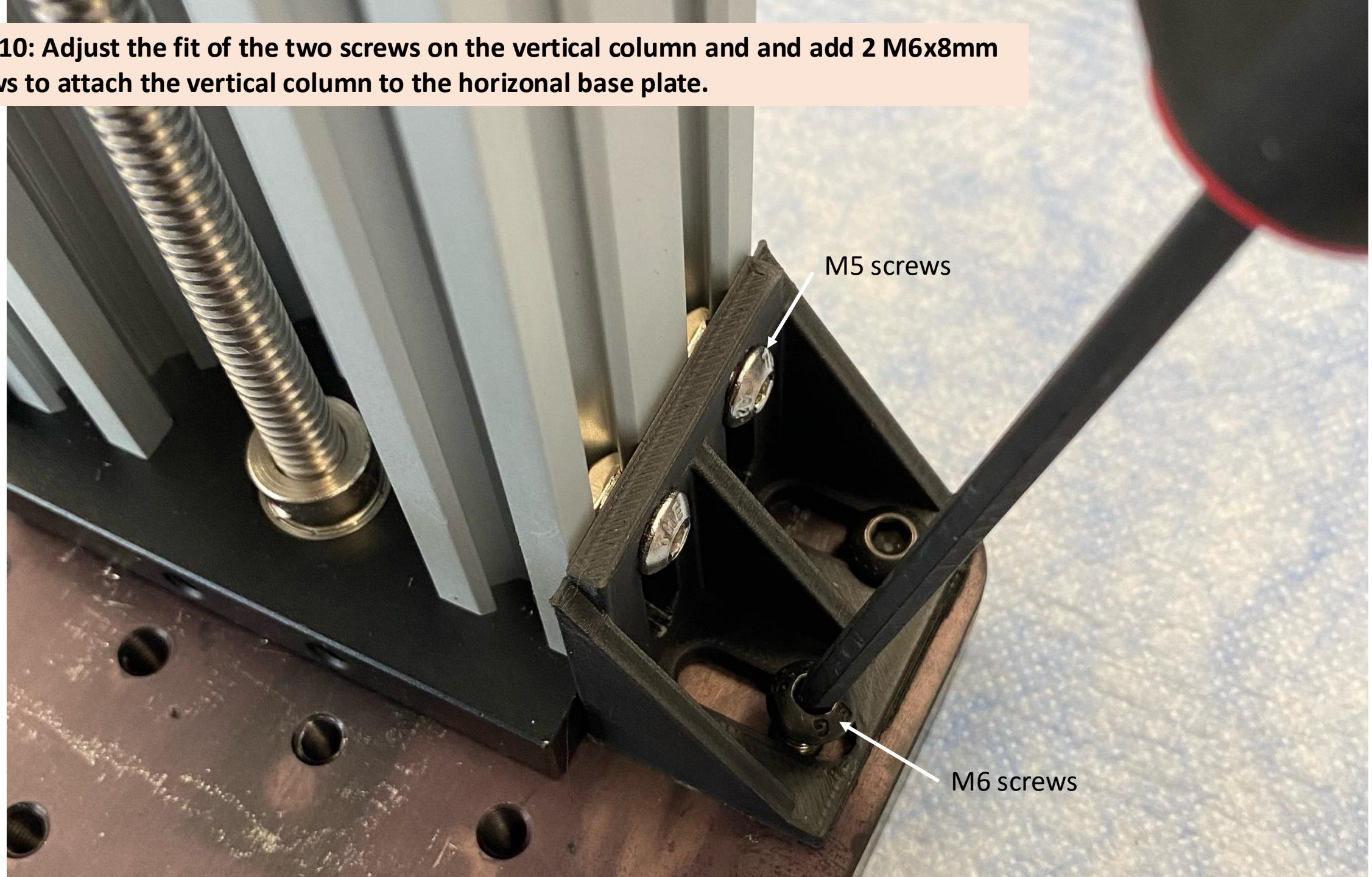
Step 8: Thread the tube extender ring (D) onto the top of the microscope tube (E).
Thread the C-mount lock-nut (C) onto the tube extender ring (D).
Thread the C-mount collar assembly (A and B) onto the tube extender ring (D)

Step 9: Mount the entire scope assembly onto the optical base plate using the 2 narrow angle brackets. First thread M5x8mm screws through the longer opening and loosely attach an M5 t-slot nut. Then drop the nuts into the channels on the Linear stage and finger tighten.

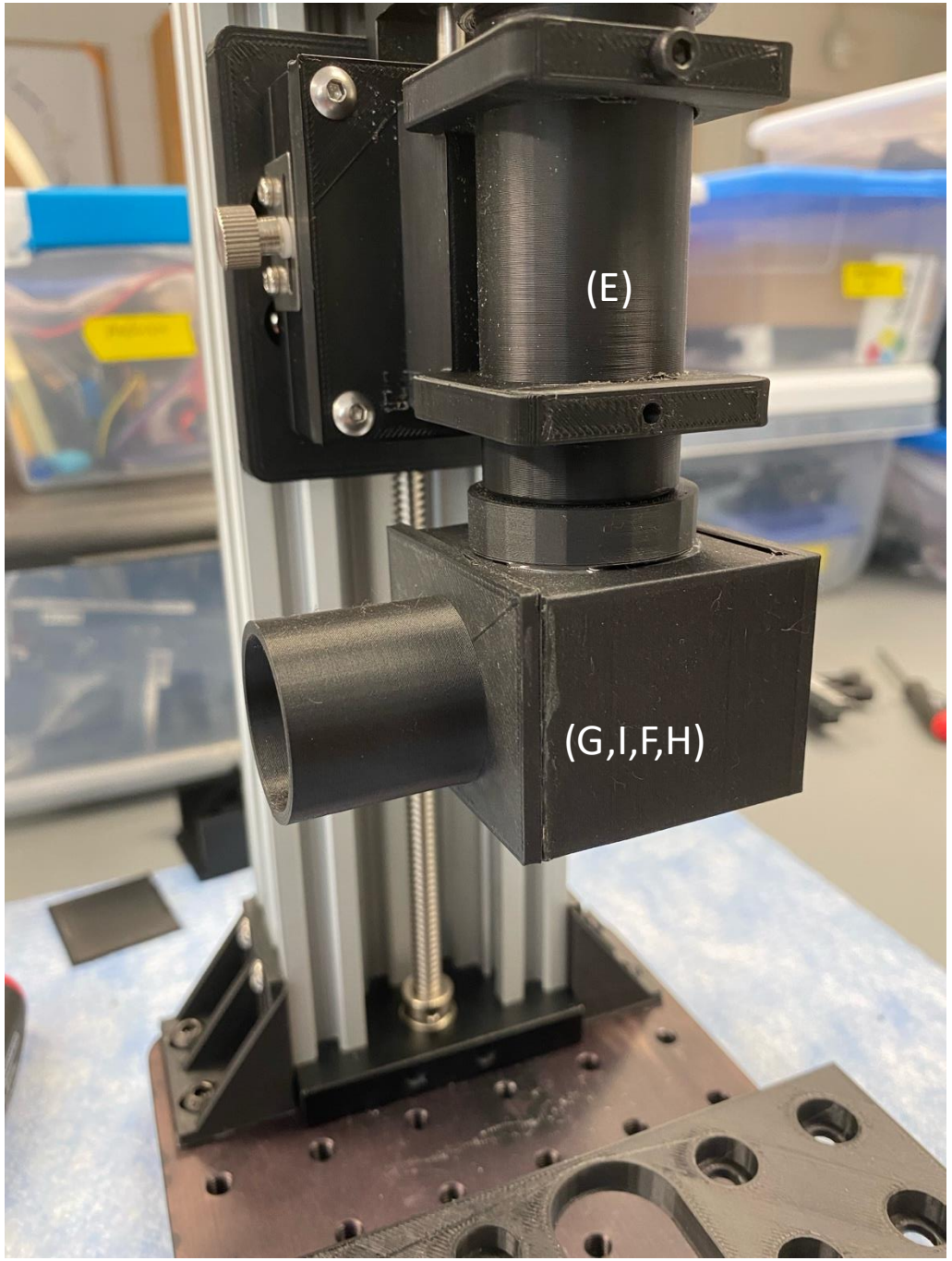




Step 10: Adjust the fit of the two screws on the vertical column and and add 2 M6x8mm screws to attach the vertical column to the horizonal base plate.

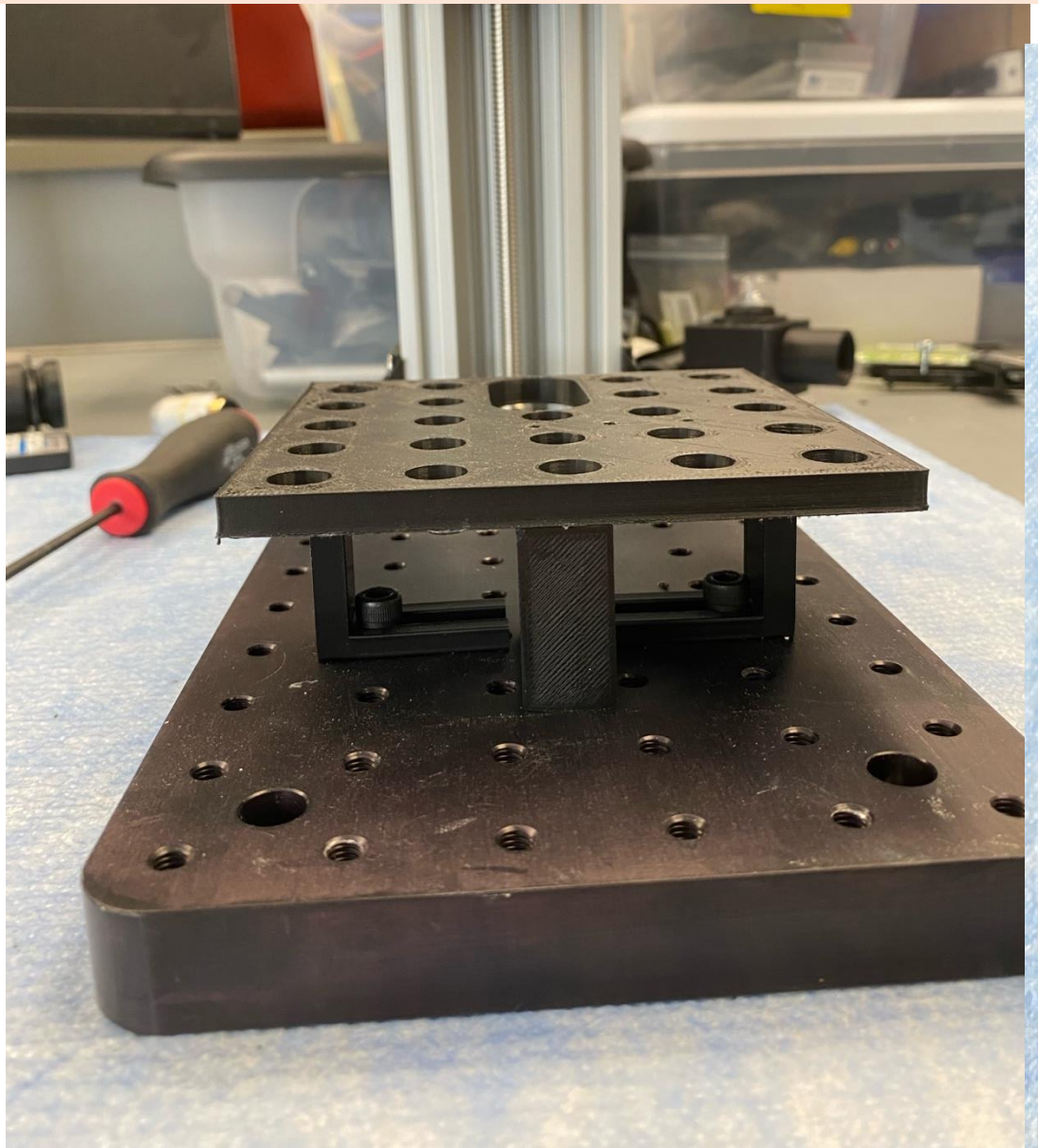


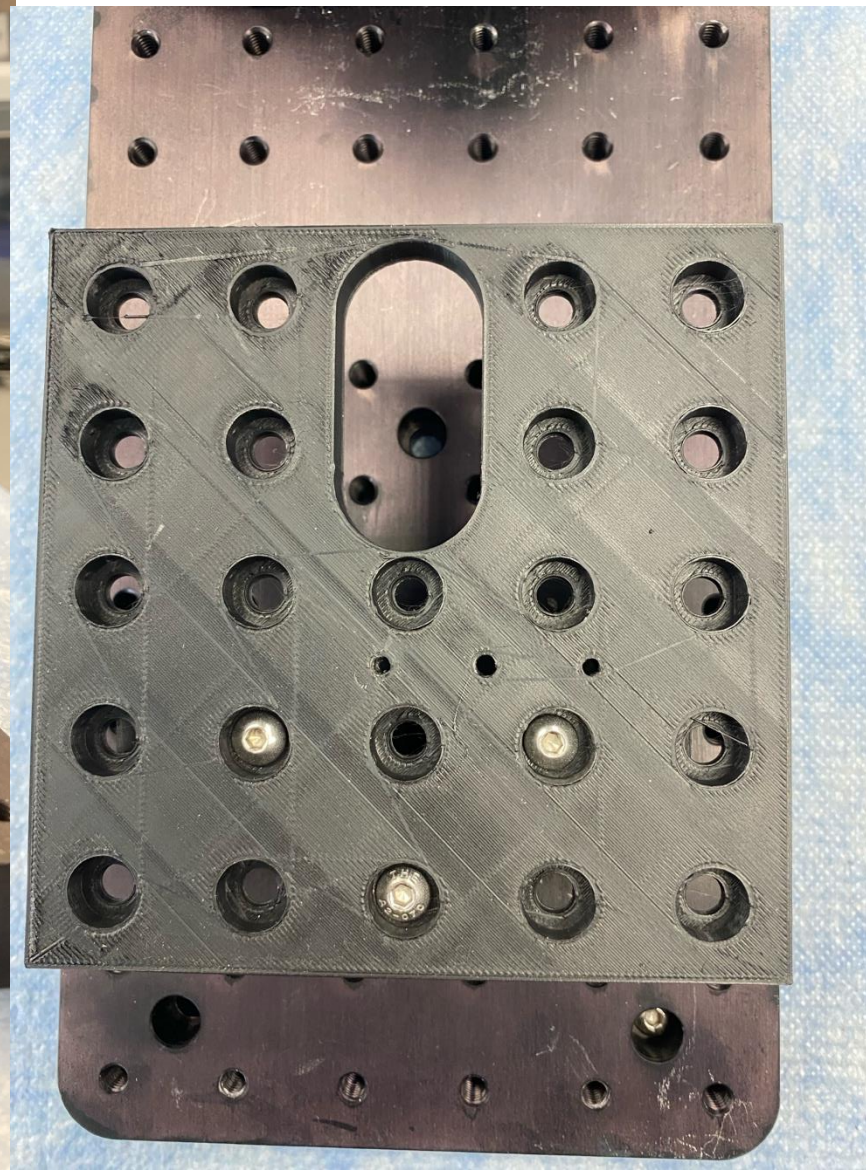
Step 11: Thread the filter cube holder assembly (parts G, I, F, and H epoxied together) onto the bottom of the microscope tube (E)



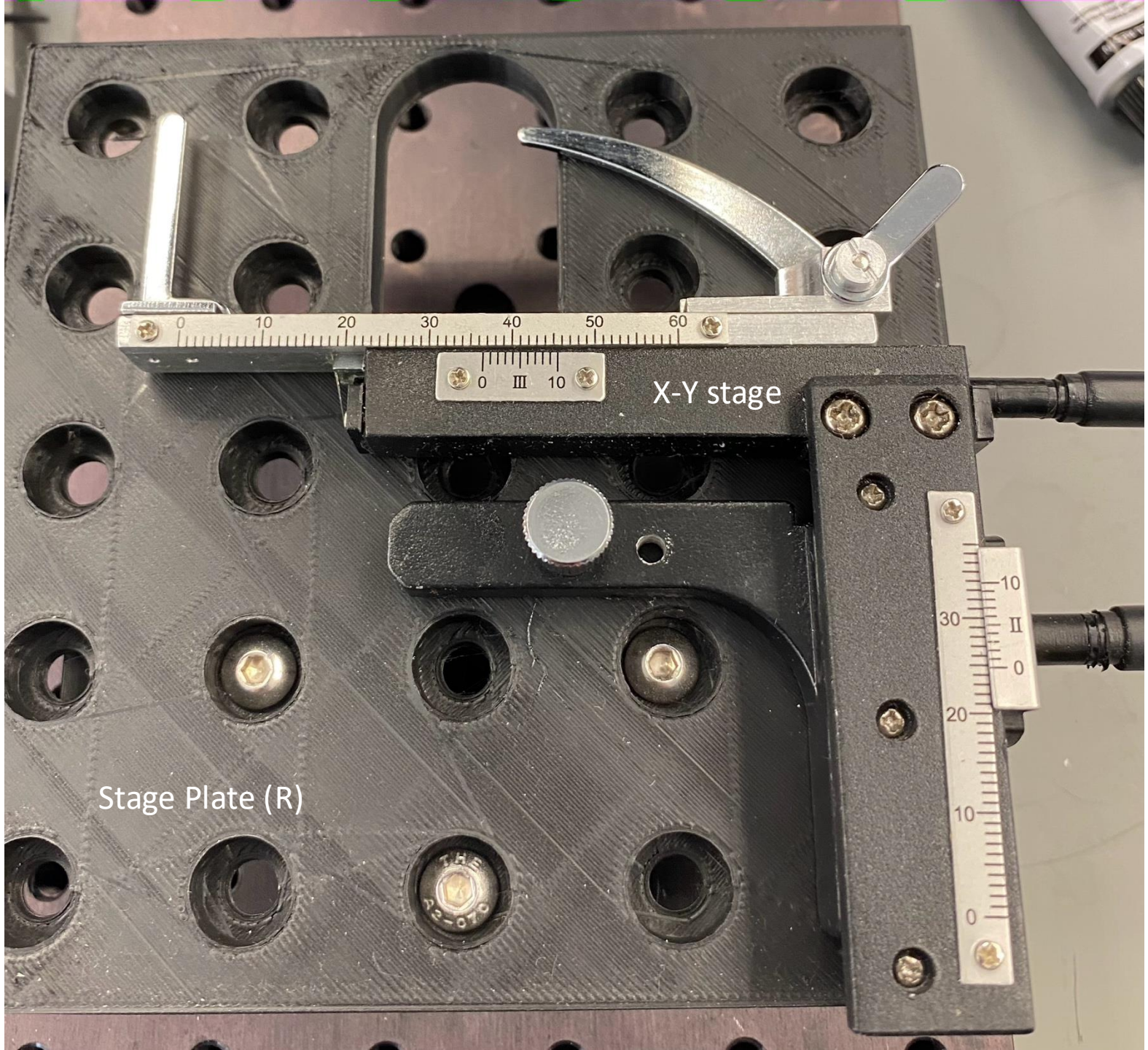
LED tube should face to the side

Step 12: Mount the microscope stage to the base plate using 3 stage brackets (P) and M5x10mm screws with nuts through the top and M6x8mm screws to hold the brackets to the base plate. Make sure the large opening on the stage is centered under the objective lens.

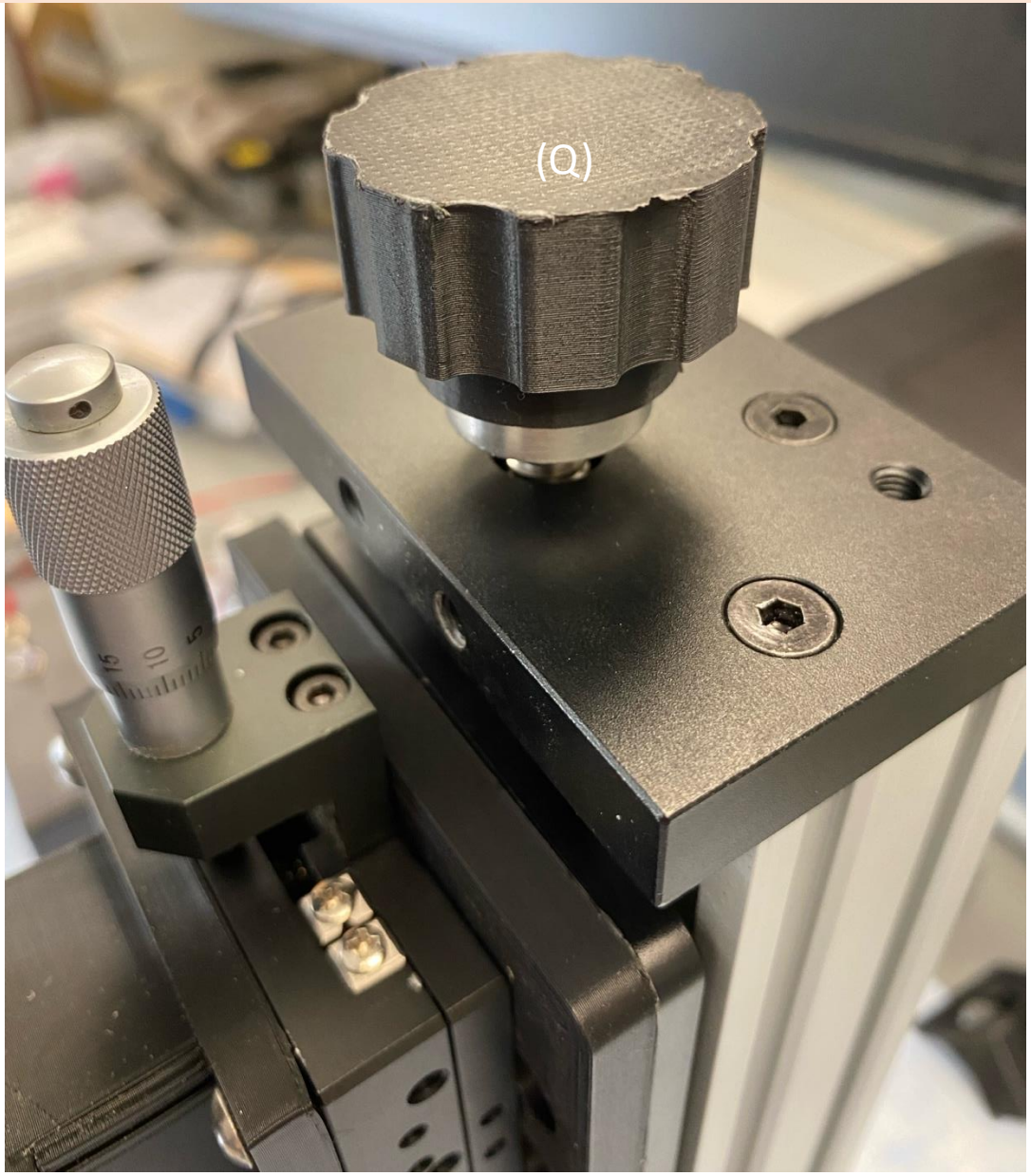




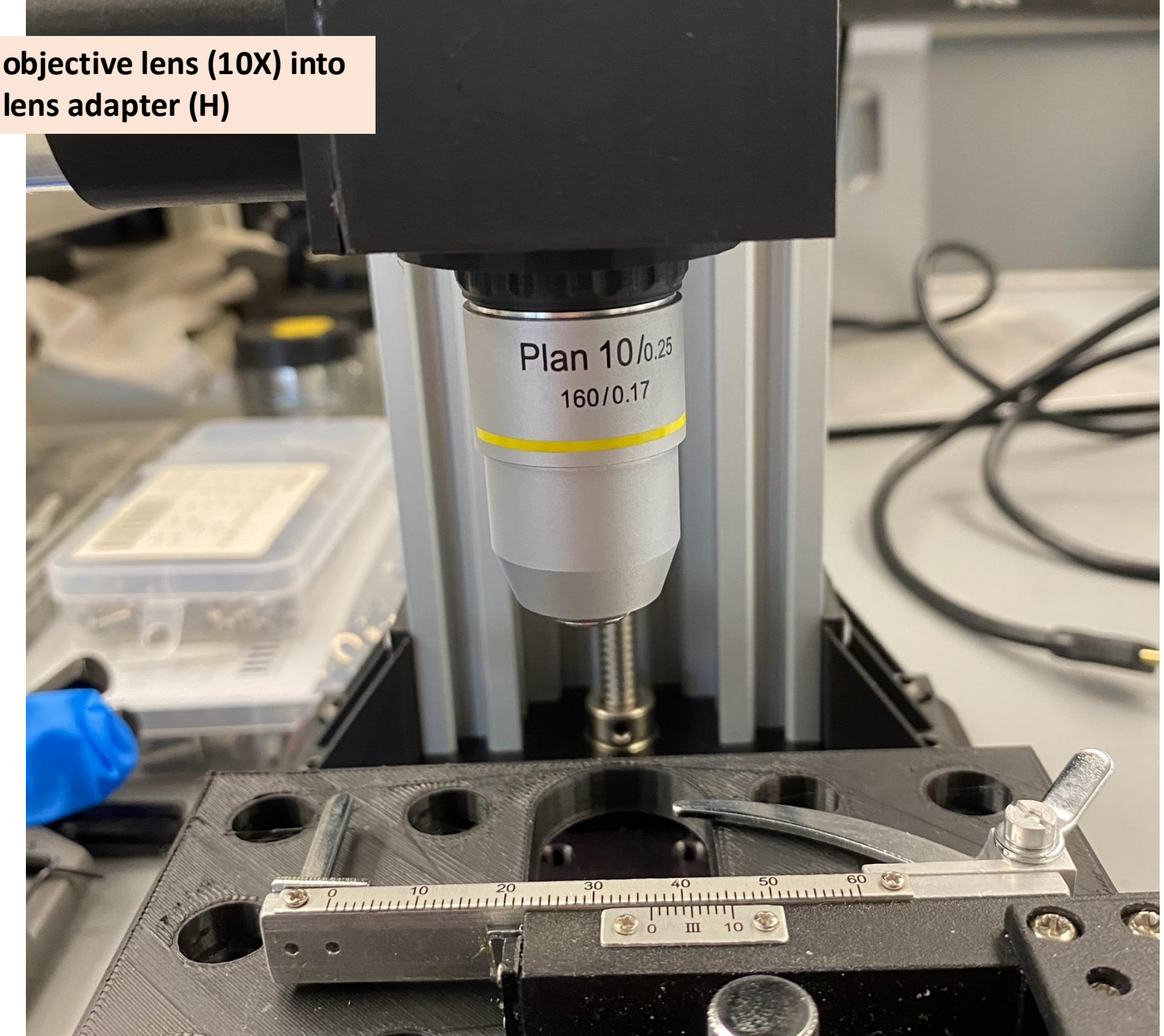
Step 13: Attach the x-y microscope stage to the top of the stage plate by inserting the pins on the x-x stage into the holes on the 3D printed stage plate. You can epoxy it in place if you want added stability.



Step 14: Attach the coarse focus knob (Q) to the top of the linear screw stage (vertical column) and tighten with a M3 screw.



Step 15: Screw an objective lens (10X) into the RMS objective lens adapter (H)



Step 16: Prepare the filter cube

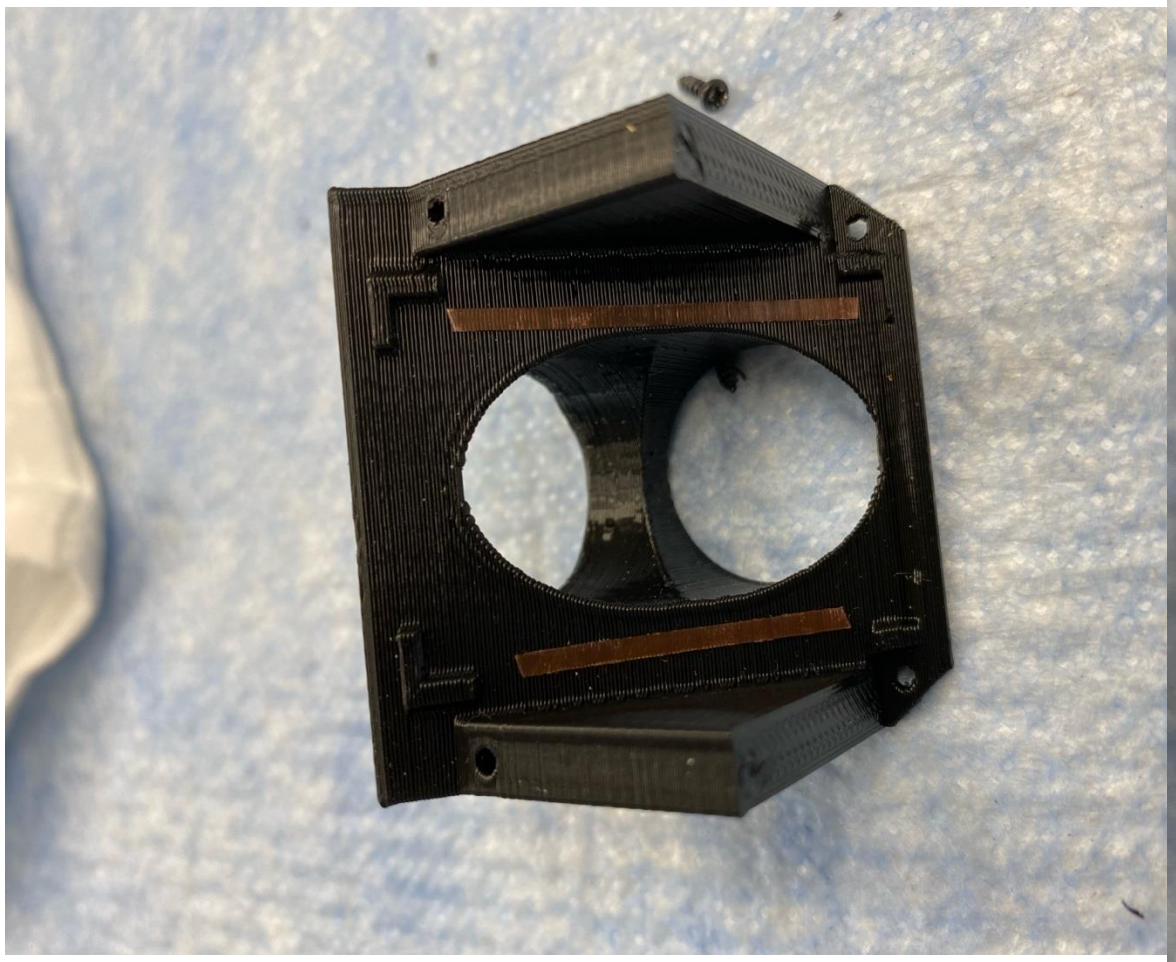
Filter cube top (K)
Filter cube bottom (L)

GFP filter set

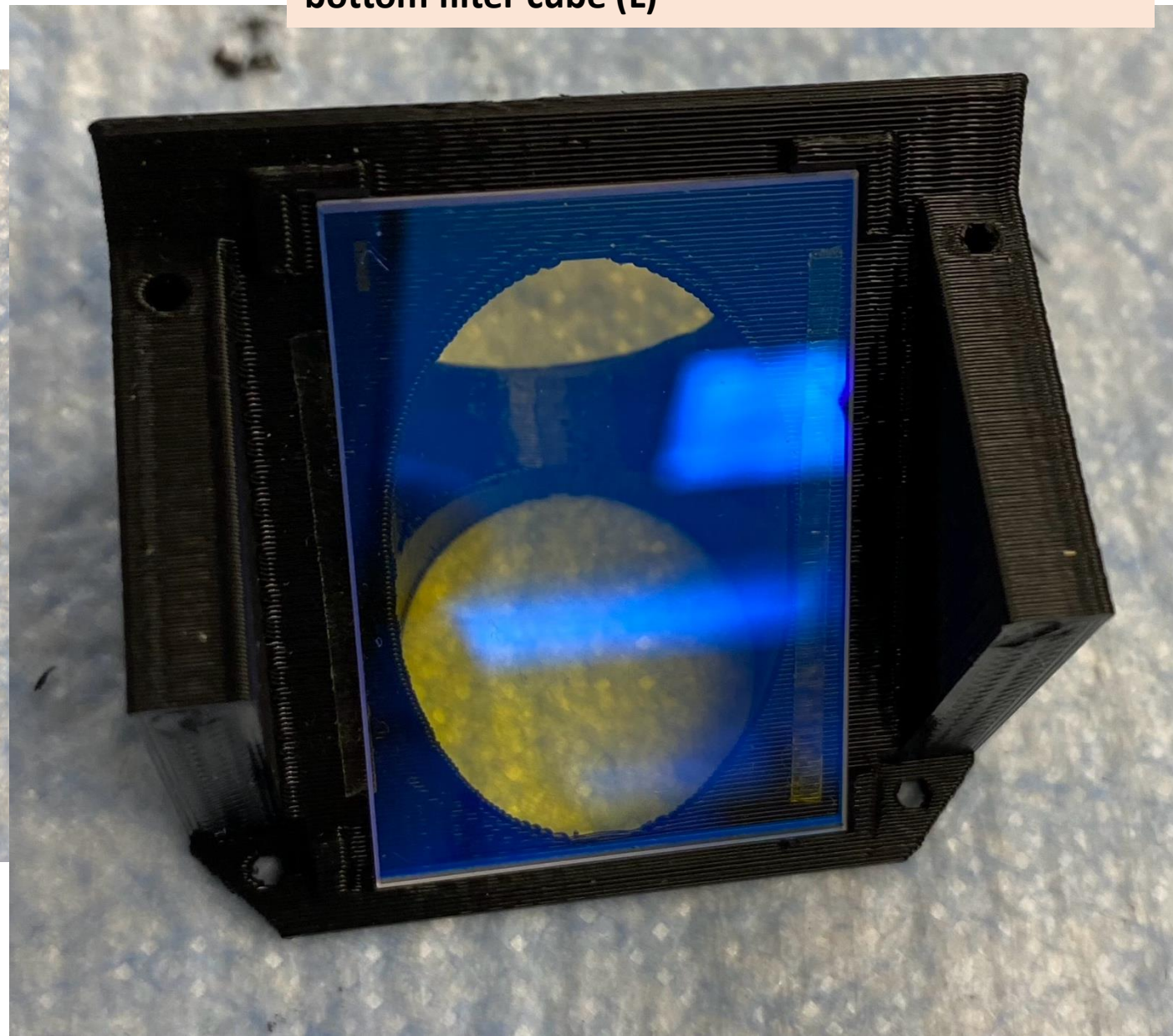
White cotton gloves
Double-sided tape

Tiny screws or double-sided tape

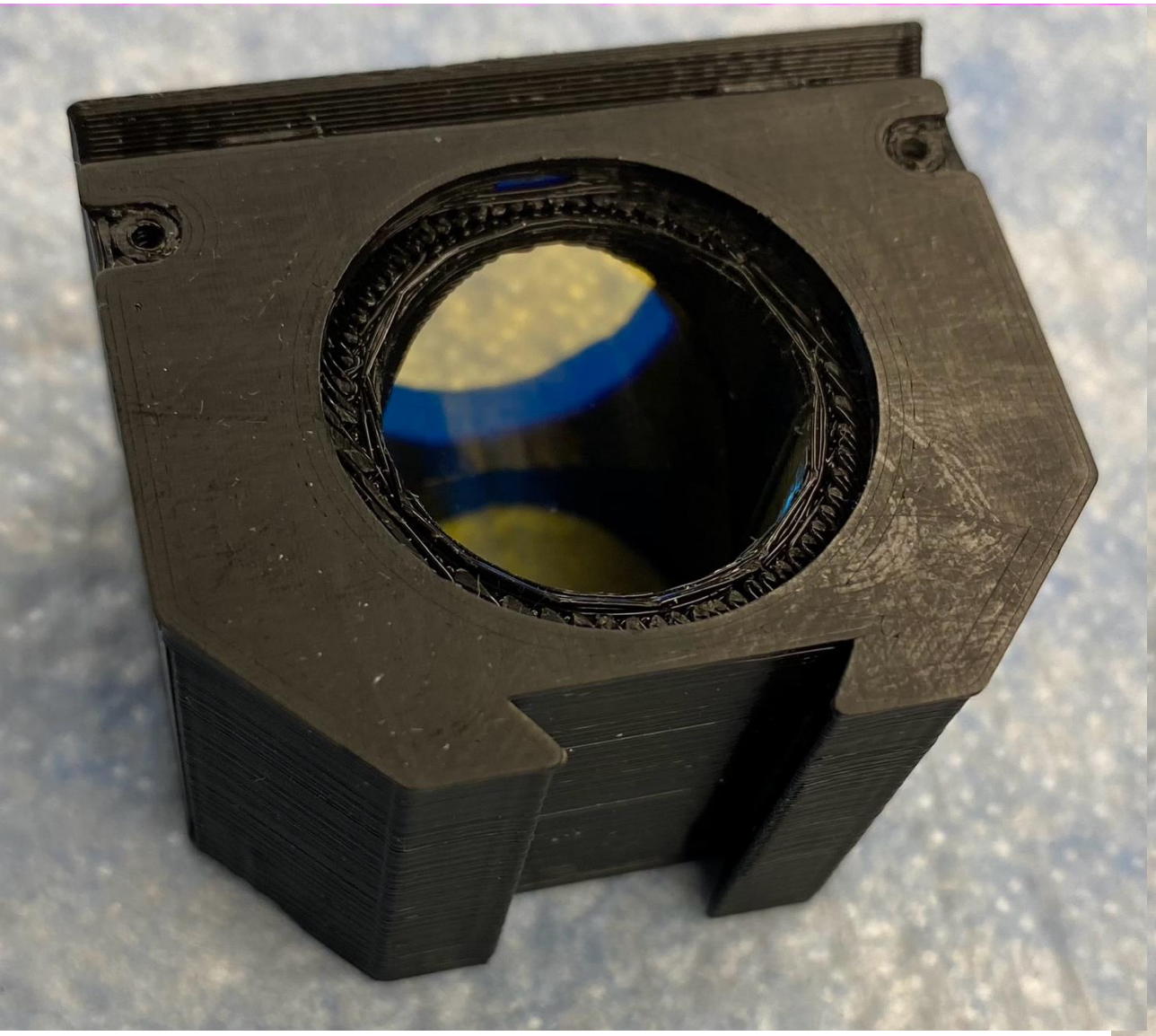
Place two small strips of double-sided tape on either side of the cube (K) to to hold the mirror in place

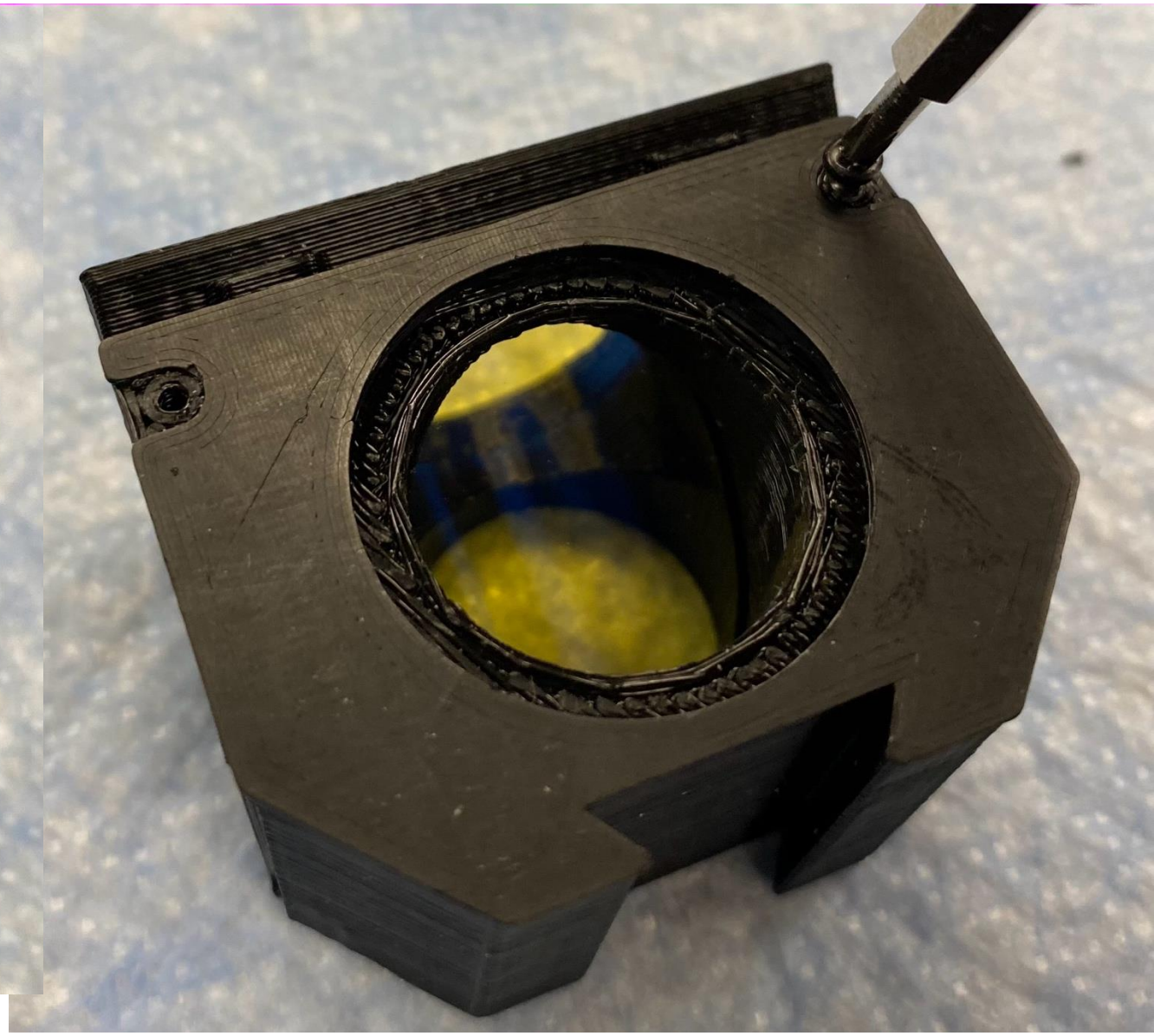


Wearing white cotton gloves – carefully place the dichroic mirror on the 45-degree platform in the bottom filter cube (L)

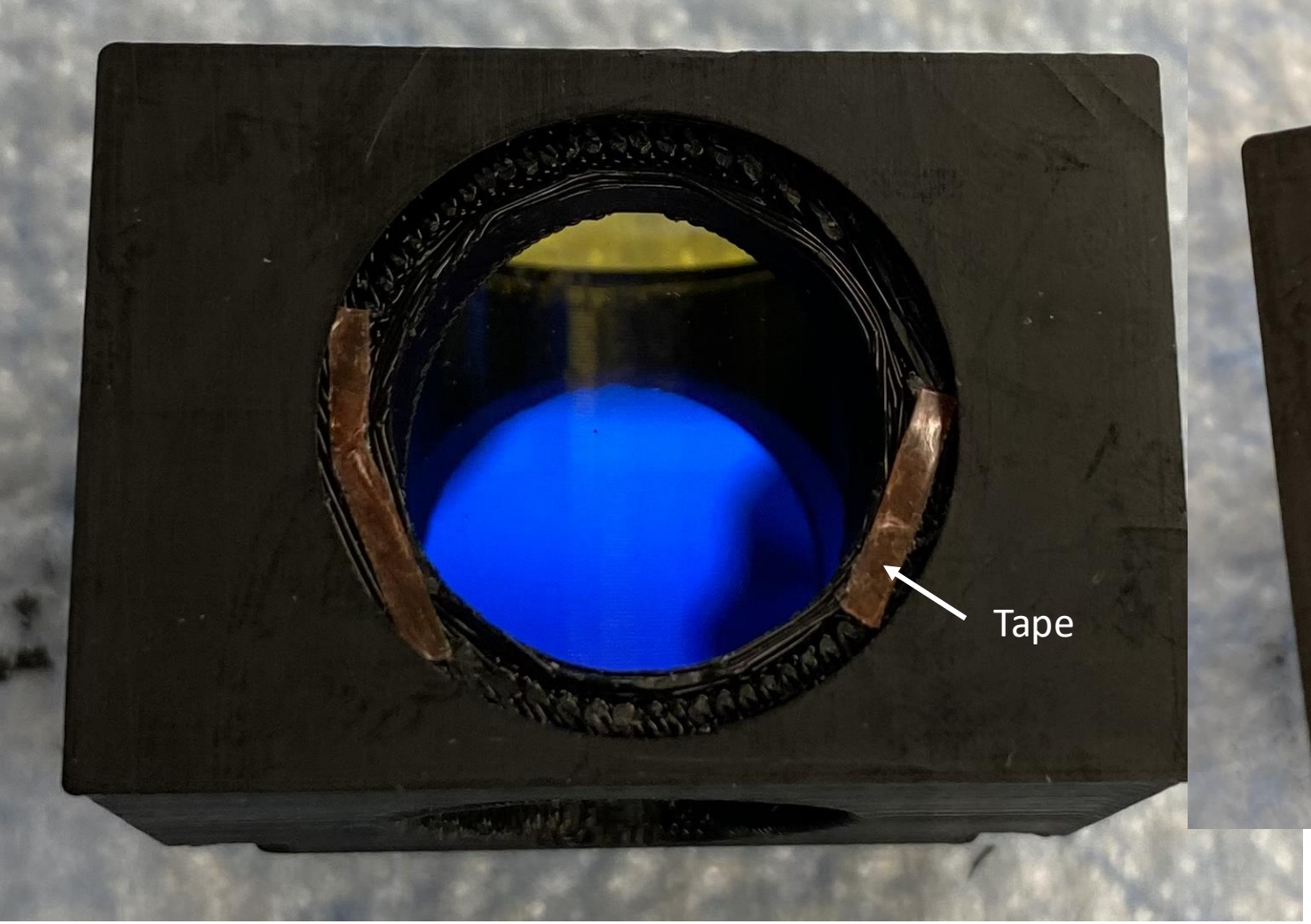


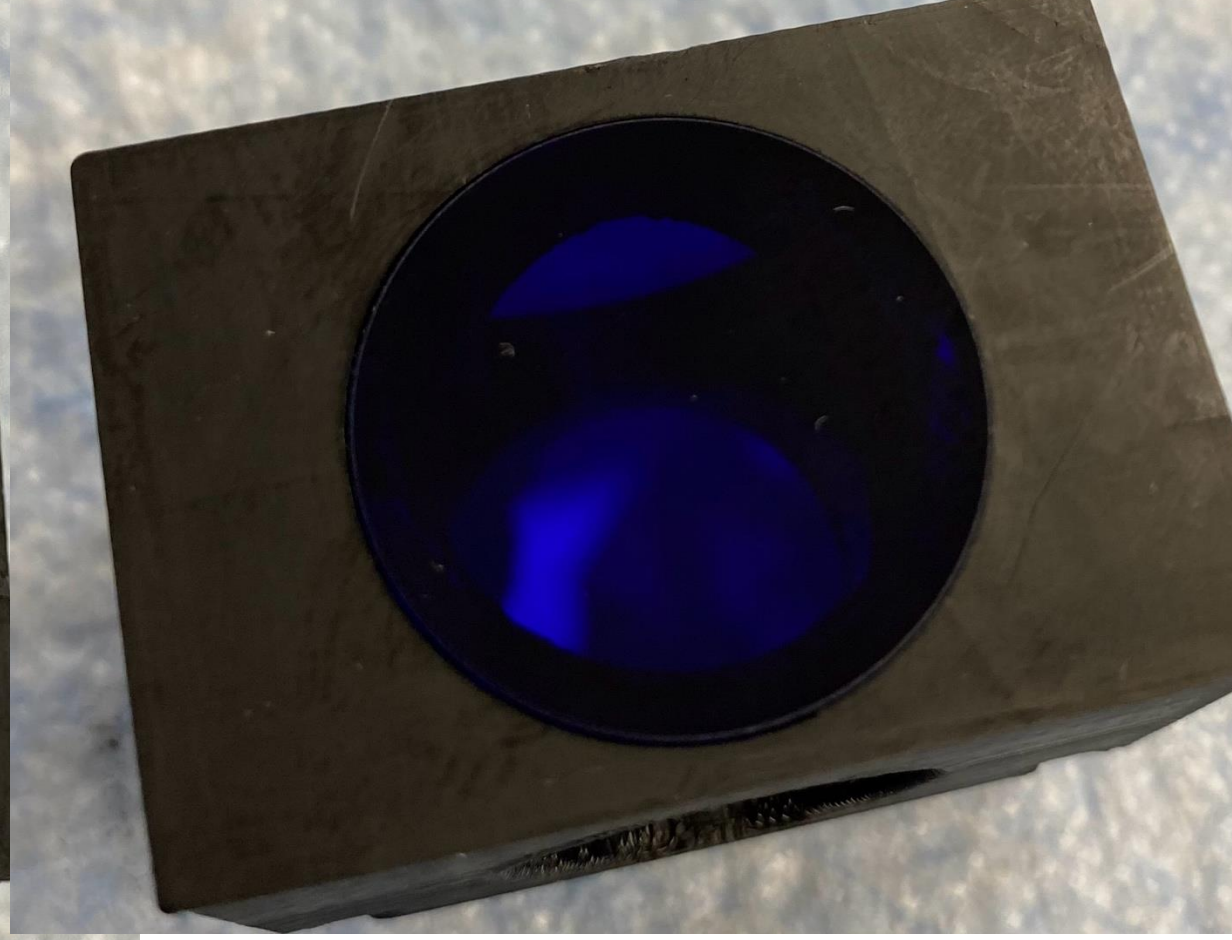
Follow manufacturers instructions for positioning the filters





Place filter cube parts together and screw in two mini screws to secure the top and bottom of the cube together

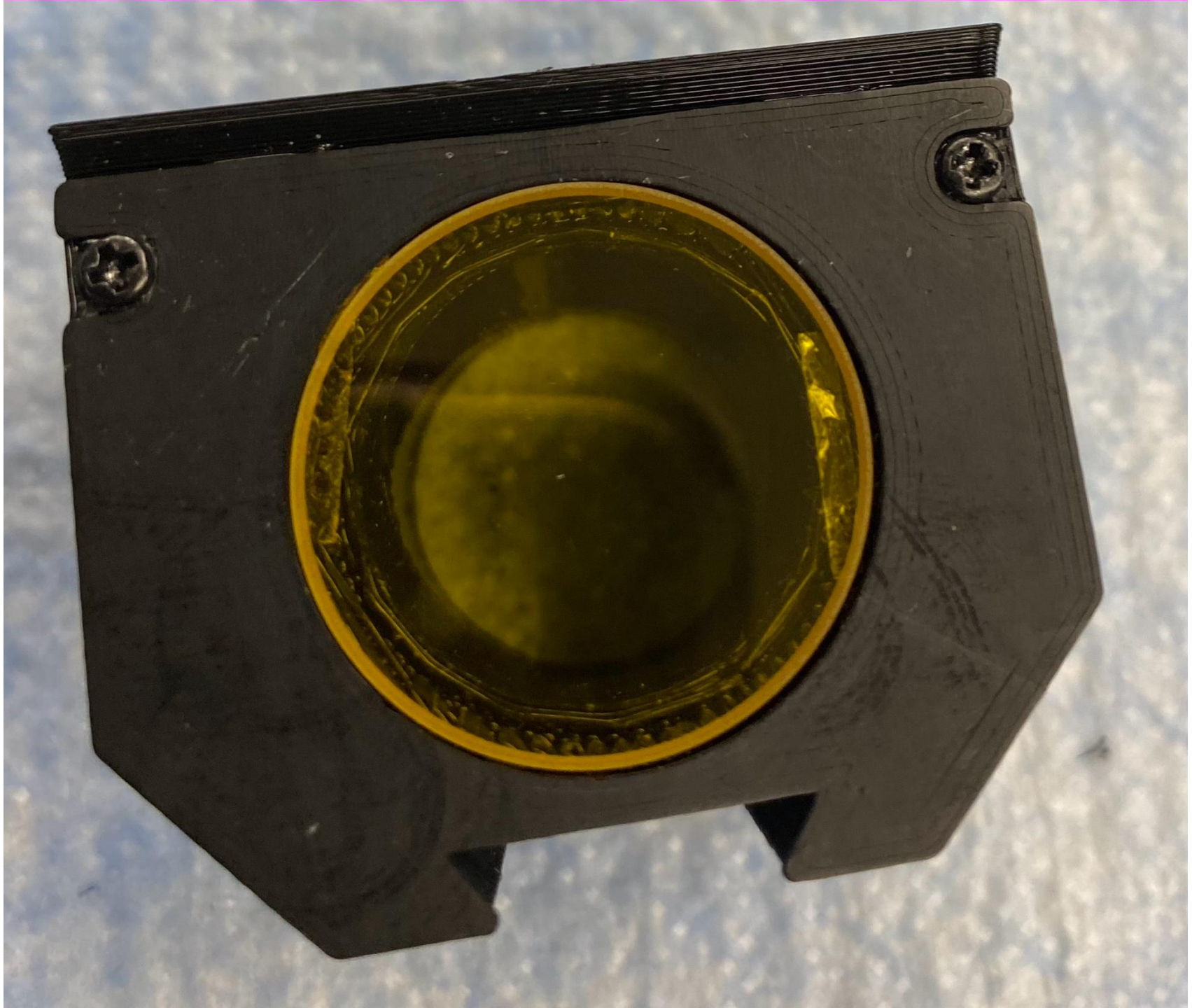




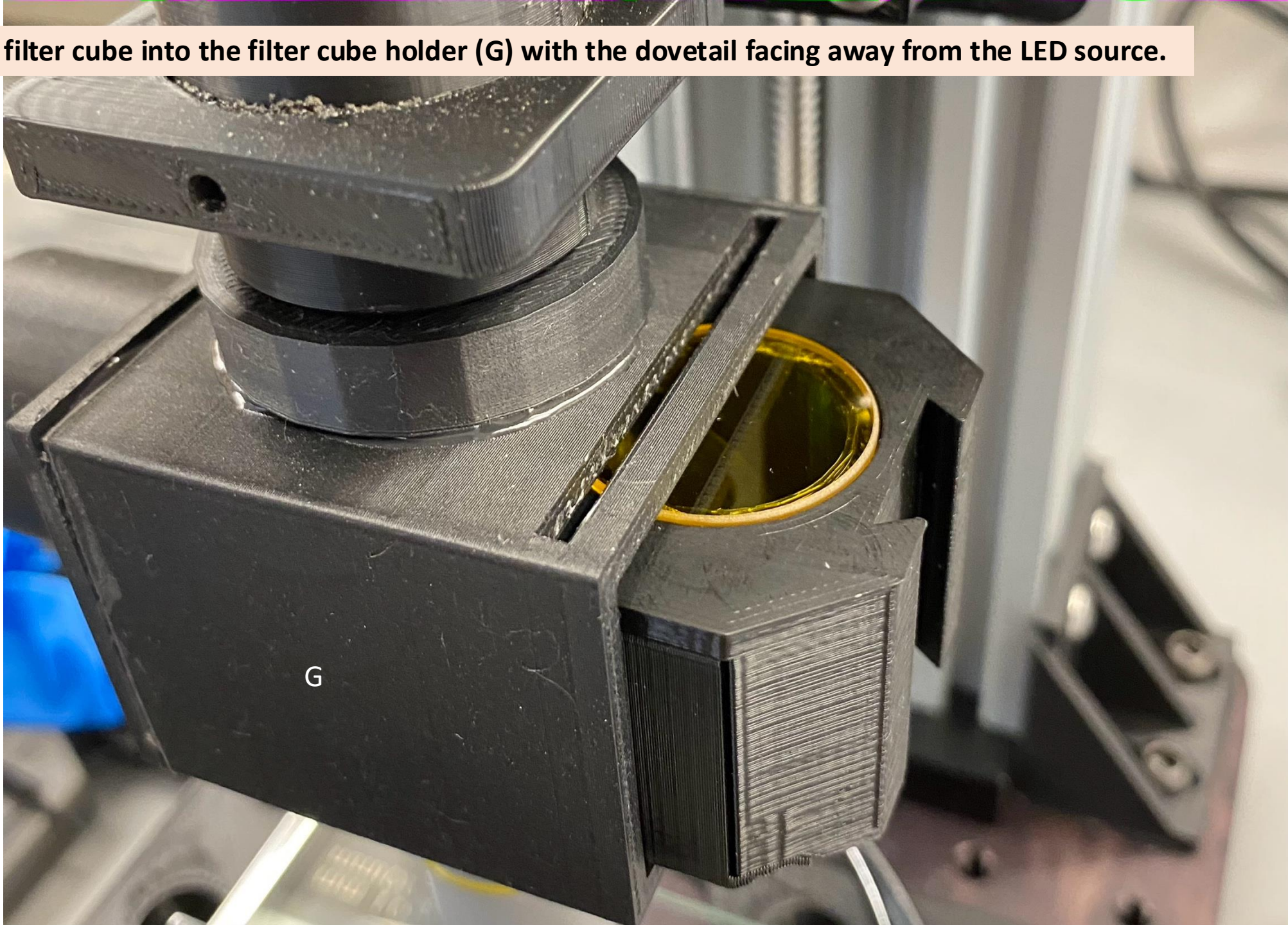
Place two small strips of double-sided tape onto the lower rim of the filter opening and gently insert the glass filter.

Follow manufacturers instructions for correct orientation of the filters.

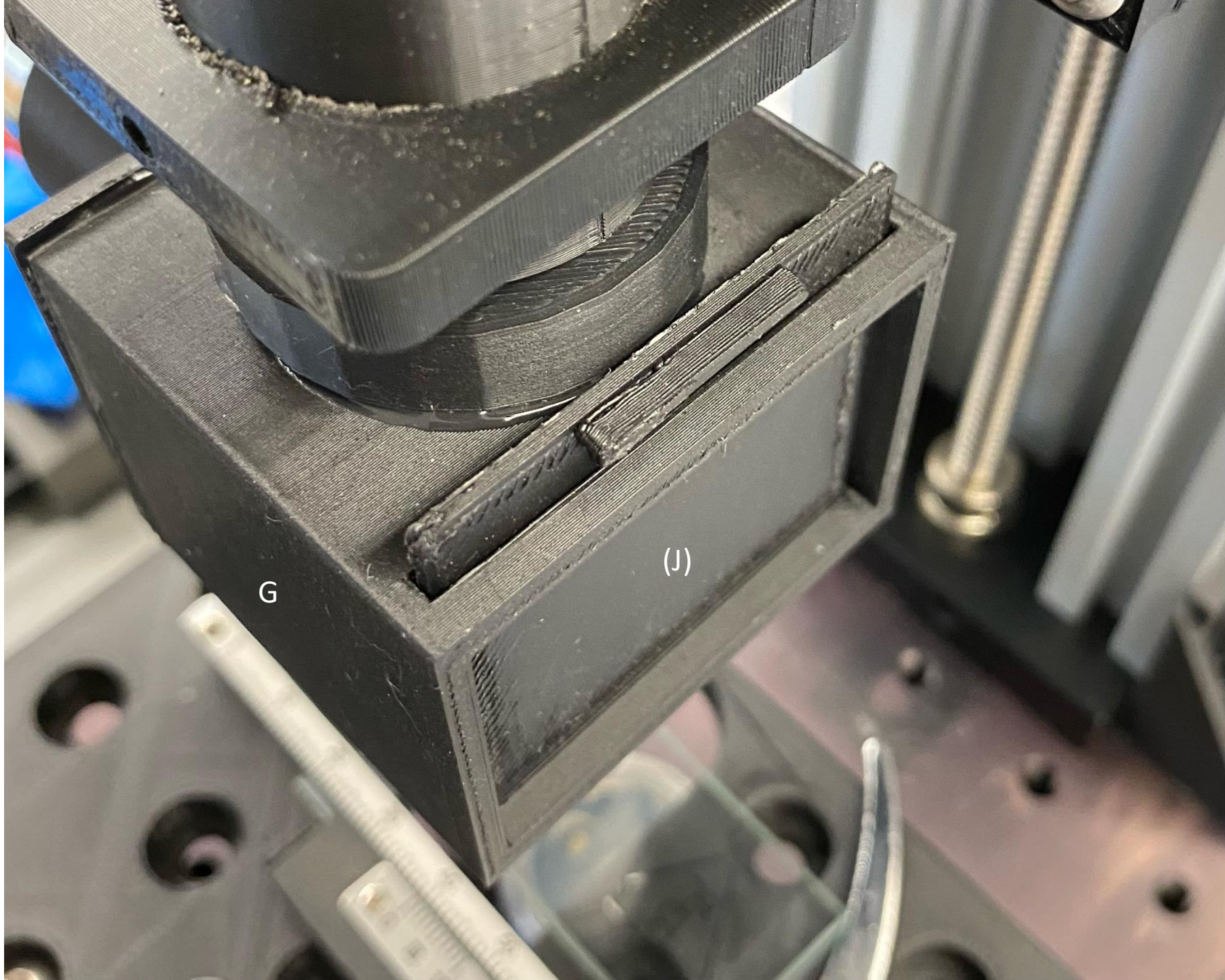
Repeat the process for the remaining filter.



Slide the completed filter cube into the filter cube holder (G) with the dovetail facing away from the LED source.

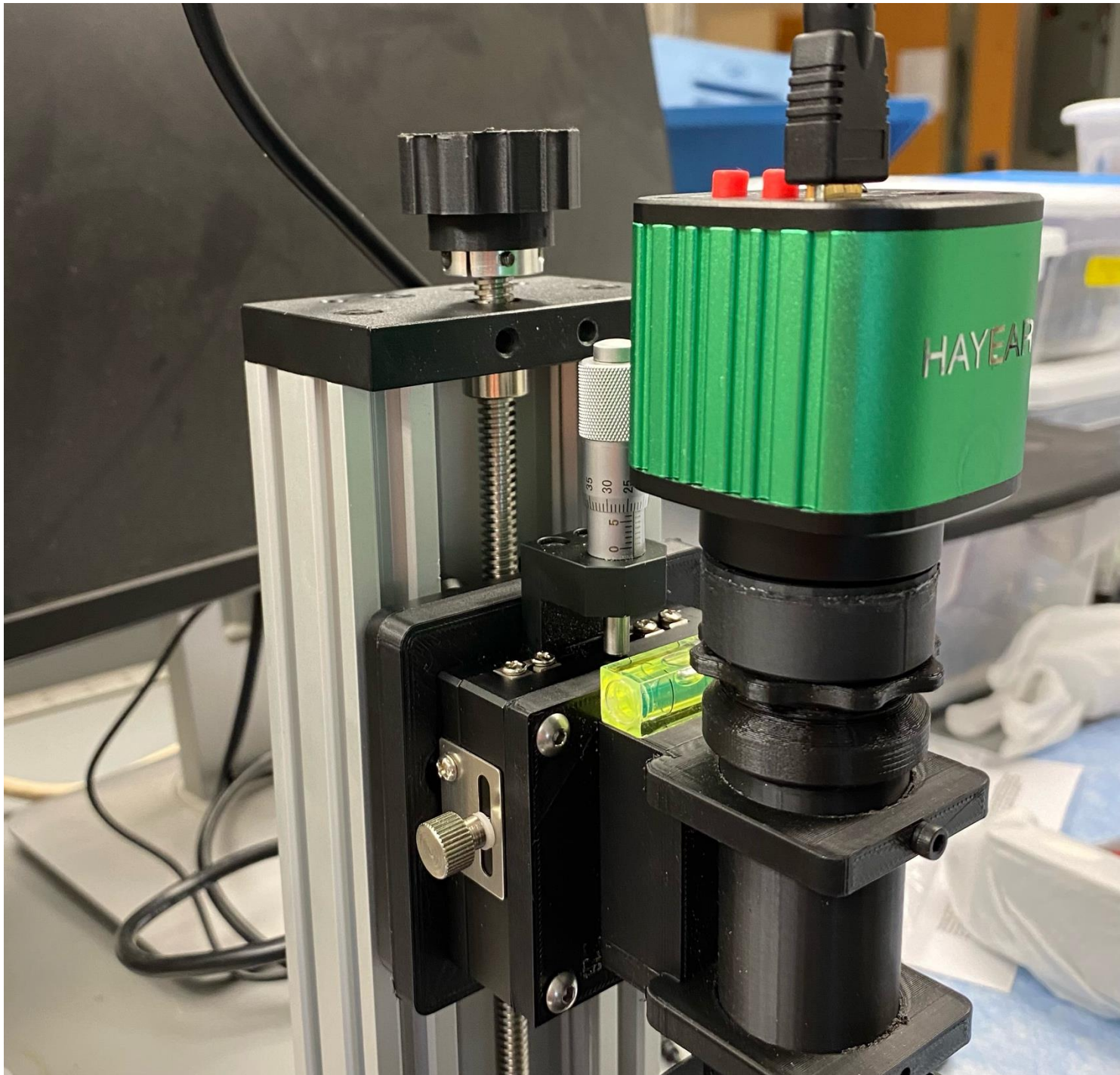


Slide the filter cube in all the way. Insert the filter cube door (J) into the slot on the top of the filter cube holder (G)

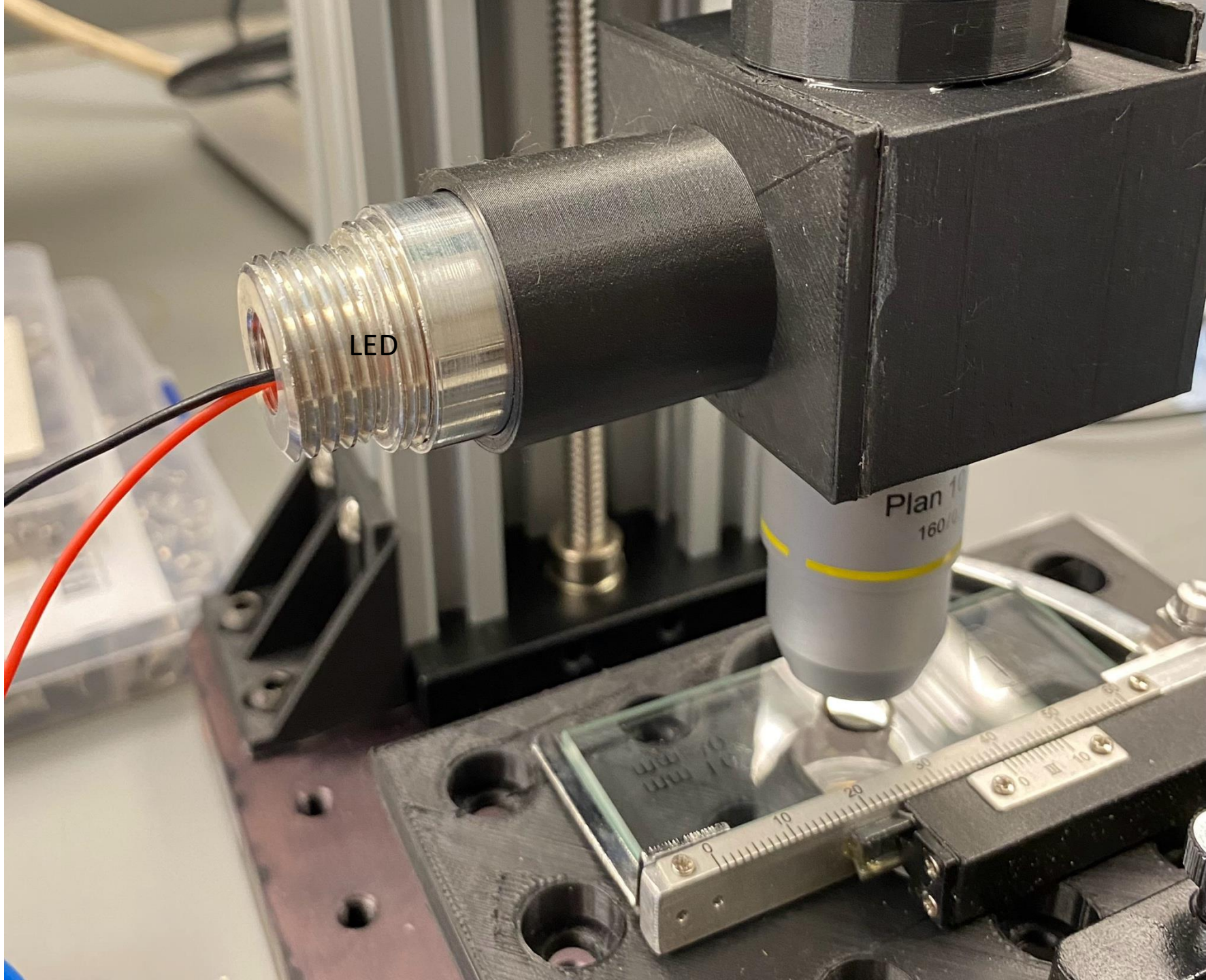


Step 17: Attach the camera to the C-Mount

Here a color HDMI camera has been attached



Step 18: Inserting the LED light

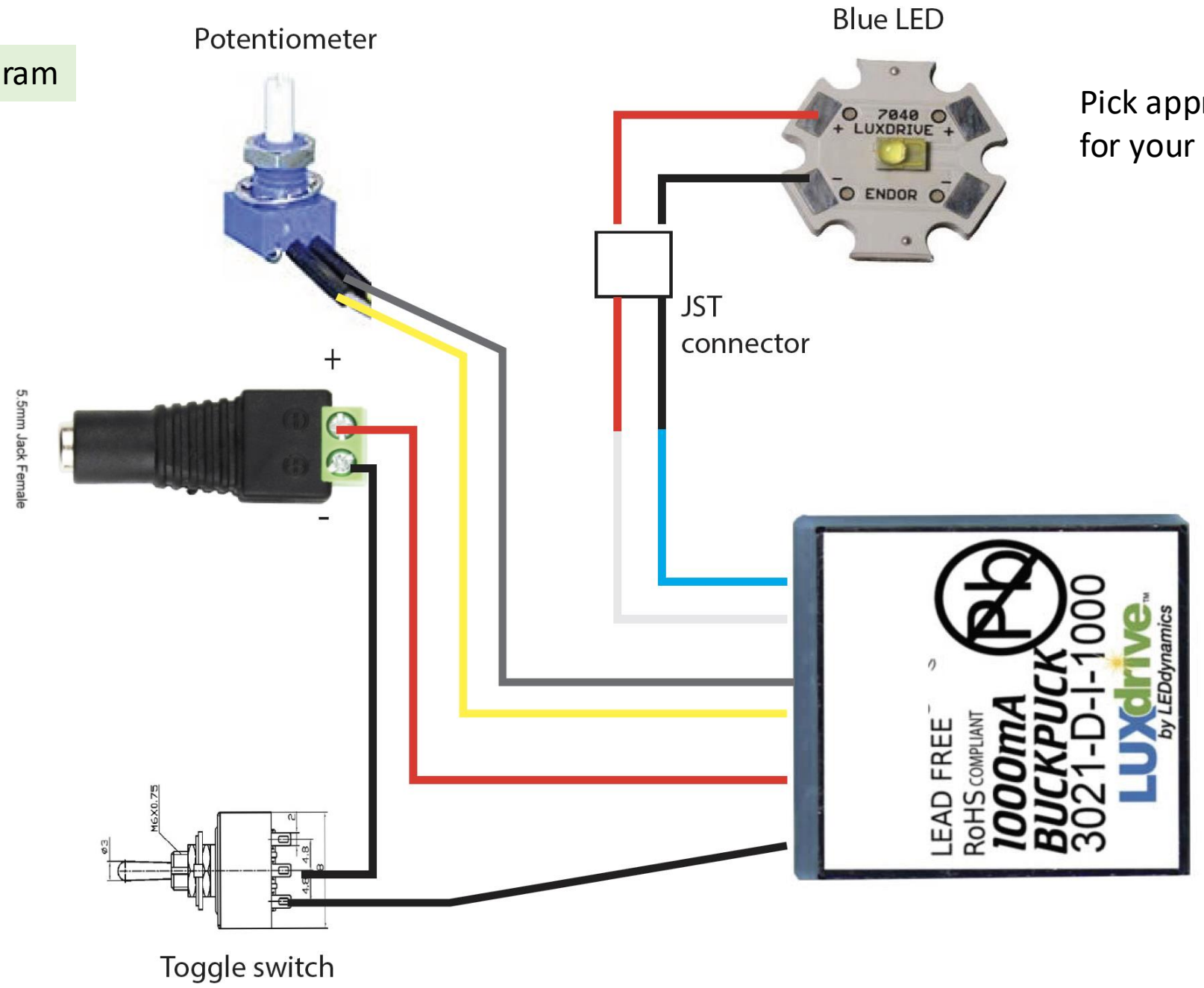


Building the LED light source

Bill of Materials

Qt	Part	Unit cost	Total cost	Source
1	**Lueon rebel 470nm Blue LED w/ 9o optic 700mA**	$ 7.33	$ 7.33	https://www.ledsupply.com/leds/luxeon-rebel-color-leds
1	**Carclo lens -frosted narrow spot**	$ 1.25	$ 1.25	https://www.ledsupply.com/led-optics/10194-carclo-lens-frosted-narrow-spot-led-optic
1	**heat sink 1 up LED Housing**	$ 10.99	$ 10.99	https://www.ledsupply.com/led-heatsinks/dynamic-led-heatsink-housing
1	**wire harness for BuckPuck**	$ 4.99	$ 4.99	https://www.luxeonstar.com/wiring-harness-for-buckpuck-drivers-6-wire-with-pot
1	**Dimmable BuckPuck 1000mA**	$ 14.99	$ 14.99	https://www.luxeonstar.com/1000ma-externally-dimmable-buckpuck-dc-driver
1	**Project box (or equivalent)**	$ 4.41	$ 4.41	https://www.amazon.com/BUD-Industries-CU-1874-B-Plastic-Utility/dp/B005T5CZHC/ref=sr_1_55?fst=as%3Aoff&qid=1572178033&refinements=p_n_feature_keywords_browse-bin%3A2803809011%2Cp_36%3A1253528011&rnid=1243644011&s=hi&sr=1-55
1	**12V Power Supply (12V-5Amp AC/DC adapter**	$12	$12	Any source

LED Wiring Diagram



Pick appropriate color LED for your fluorescence probe

To 12V wall adapter