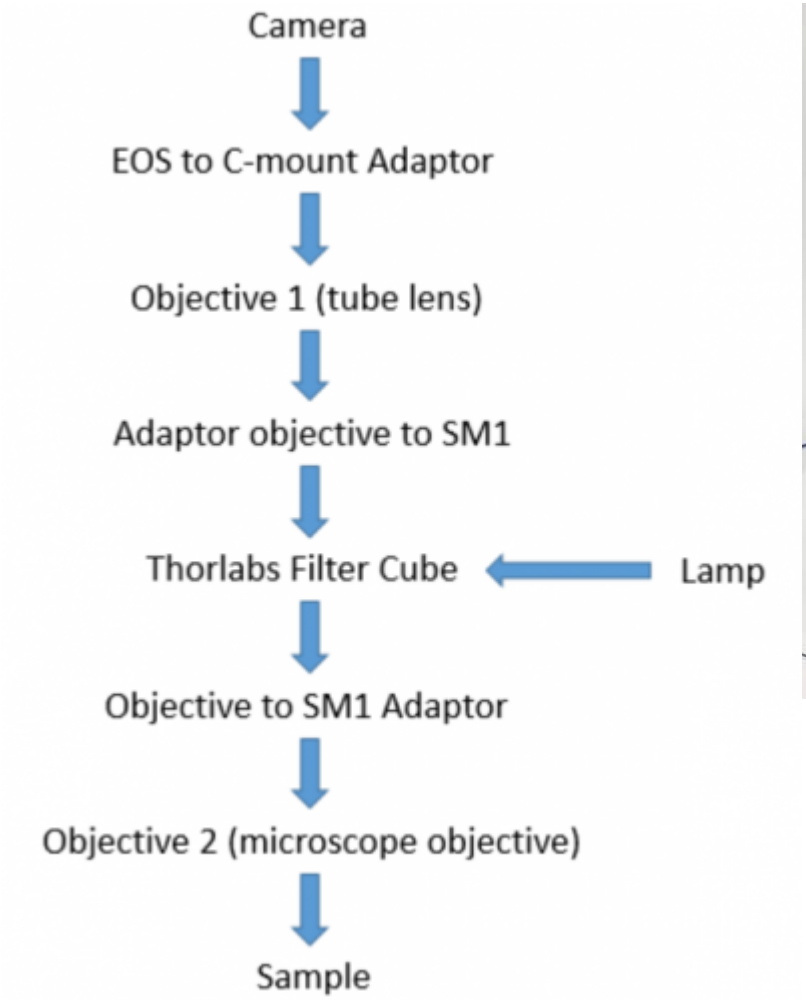
Assembling microscope optics

Schematic



Components

- LED
- Objective and lens tube. This is done with a 50 mm objective.
- EOS to C-mount Adaptor
- Adaptor objective to SM1
- CP02/M caged plate
- Thorlabs Filter Cube
- Cap for Filter Cube
- FF520-Dio dichoric mirror
- ET 495/25x optics filter
- FF01-550/49 optics filter

- Smaller metal rods
- Larger metal rod

Step by step

1. Attach the EOS to C-mount adaptor (Figure 1) to Objective 1 (Figure 2) and the camera so the final product looks like Figure 3.

Figure 1: EOS to C-mount adaptor.

Figure 2: Objective 1 (tube lens).

Figure 3: Camera (bottom) attached to the adaptor and tube lens.

2. Thorlab Filter Cube:
    1. Remove the inner filter-holding cube from the outer cube - remember which hole is is which! Otherwise, the filters might be put in the wrong orientation.
    2. Loosen the screws holding the top half of the filter-holding piece to the bottom half so that the middle section can be accessed
    3. Assembling Thorlab Filter Cube - see Figure 4 below for layout/directions:

Figure 4: Outside portion of the Filter Cube showing the orientation of the filters inside. The white rectangles along the edges are the optical filters, while the slanted rectangle in the center is the dichoric mirror.

1. Center - FF520-Dio (dichoric mirror) - recommended to insert this BEFORE the optical filters - check for dust and finger prints before inserting - loosen the metal piece with clips on either side in the center of the cube until the screws are quite loose (to prevent scratching the coating) - insert the dichoric mirror so that readable text is facing AWAY from you (i.e. the coated side is facing TOWARDS the light) - screw the dichoric into place by screwing until you have to *barely* apply pressure to turn further
2. Top - FF01-550/49 (optical filter) - unscrew the ring locking the filter in place using a large cylindrical screw tool - place the filter inside the hole so that the ARROW on the side of the filter is facing IN THE DIRECTION of where the light is going (aka up towards the camera) - adjust the filter using lint-free cotton tips to prevent dust and finger print transfer - fit ring over filter and screw into place
3. Right - ET 495/25x (optical filter) - same as above with arrow pointing AWAY from the lamp
4. Left - see Figure 5 below for black screw cap - this hole will not be used for now

Figure 5: Completed Filter Cube with camera and Objective 1 on the left and Objective 2 on the right.

4. Place the filter-holding cube into the outer cube in the correct orientation

3. As also seen in Figure 5, screw on the Objective to SM1 adaptor to the top of Objective 2 (microscope objective) - the short distance part of the lens should be facing towards the sample and the long distance lens should face into the Filter Cube (i.e. the text on the lens should not be upside-down when the optics piece is upright) - then screw the SM1 adaptor to the bottom of the Filter Cube
4. Screw the lamp adaptor then the lamp into the filter hole to the right as seen in Figure 6

Figure 6: Filter Cube (left) and lamp (right).

5. Screw on the smaller metal rods holding the optics in place to the left side of the Filter Cube as seen in Figure 7 below - afterwards adjust the cage plate to the ends of the metal rods, the cage plate should have a M4 hole on one side that should face downwards - lastly, screw the larger metal rod tightly into the M4 on the cage plate - the components from this step will be used to fix the optics to the microscope stand

Figure 7: Fully assembled microscope optics. On the left of the Filter Cube, the metal poles and cage plate (black) are used to fix the optics to the microscope stand.