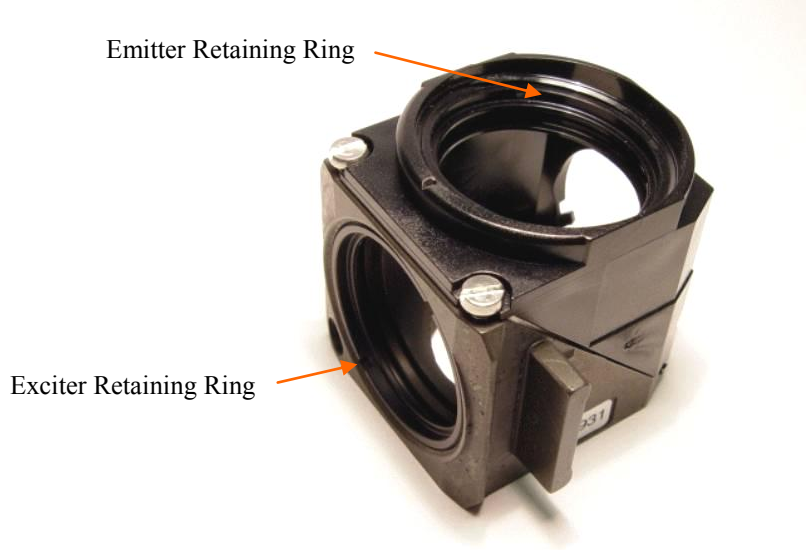
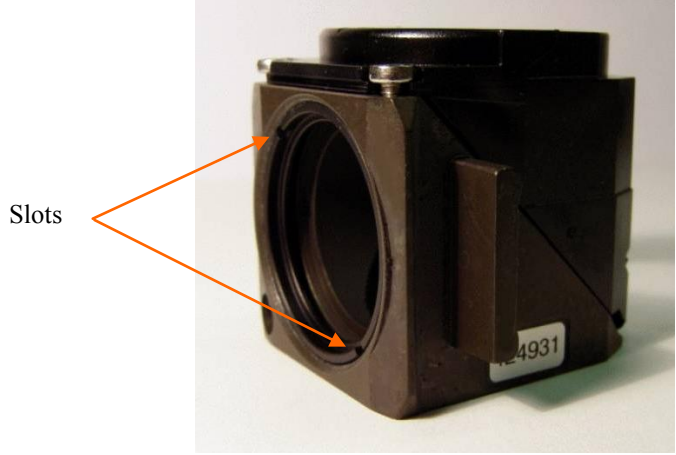


Assembling the Zeiss Cube

A Quick How-to Guide for the Zeiss
FL CUBE EC P&C



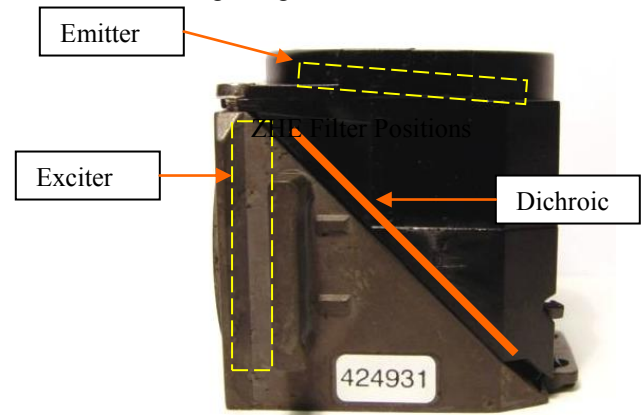
Step	Action
1.1	Disassemble Cube
1.1.1	The cube assembly has two filter retainer rings; one is located on the Exciter side and one is on the Emitter side as shown below.  Emitter Retaining Ring Exciter Retaining Ring
1.1.2	Remove both filter retainer rings from the cube assembly.
1.1.2.1	The supplied retaining rings for the ZHE cube are installed shoulder side inward. Remove the rings by gently grasping the slots with your finger tips. Applying even pressure to the retaining ring slots, turn the ring outward (counterclockwise) to remove from the cube assembly.  Slots

Step	Action
1.1.2.2	Note that there are two distinctly different sides to the retainer rings. One is the “flat” Shoulder Side and one is the Open Side. The Open Side ALWAYS faces into the cube assembly and is tightened <i>against</i> the installed filter. The Shoulder Side faces outward. The two sides are shown below for reference. Open Side Shoulder Side 

Step	Action
1.2	Install the Semrock Filter Set
1.2.1	The diagram below illustrates a cross section of the Zeiss ZHE cube for use in orienting and installing the Exciter, Dichroic and Emitter filters into the cube assembly. The cross section is for reference only to illustrate filter position and orientation.

Filter Positions

The Emitter is located at the top of the cube assembly. Notice it is mounted at a slight angle. The Exciter is located at the left side and the Dichroic is mounted diagonally at the center of the cube and shares the Emitter half of the assembly.



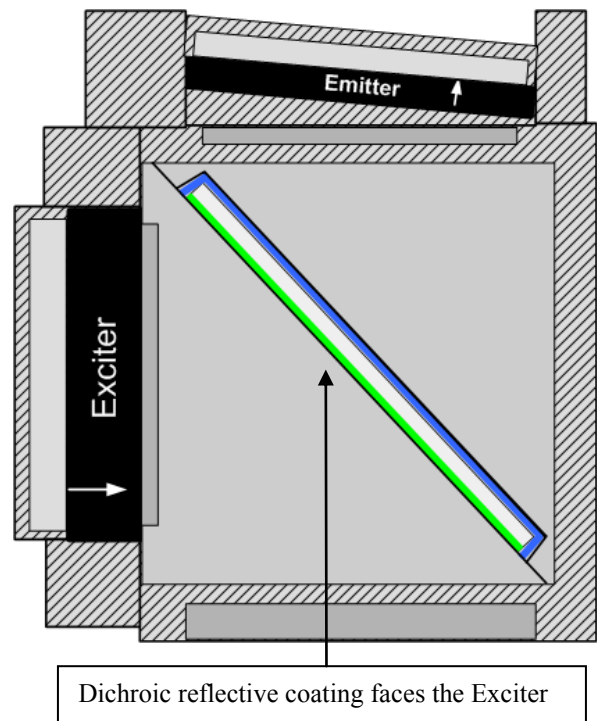
Filter Orientation

The filters are *oriented* in the assembly as follows:

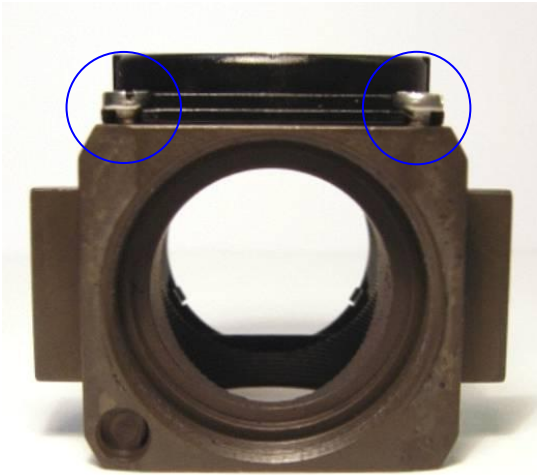
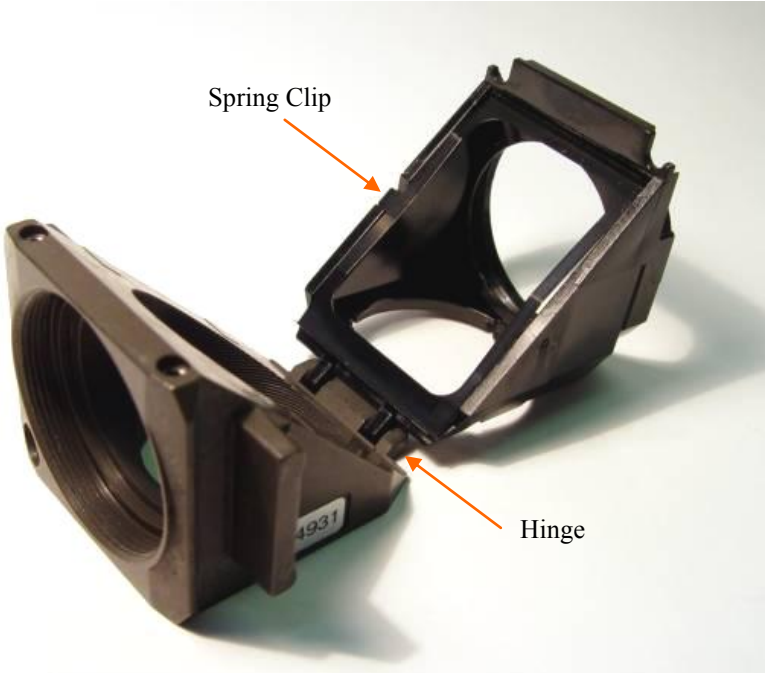
- The Exciter is mounted with its arrow pointing inward.
- The Dichroic reflective side is mounted facing the Exciter
- The Emitter is mounted with its arrow pointing outward.

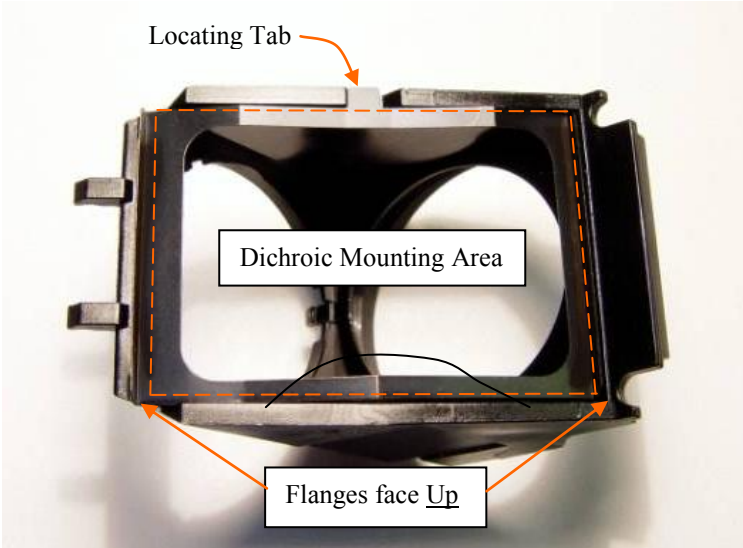
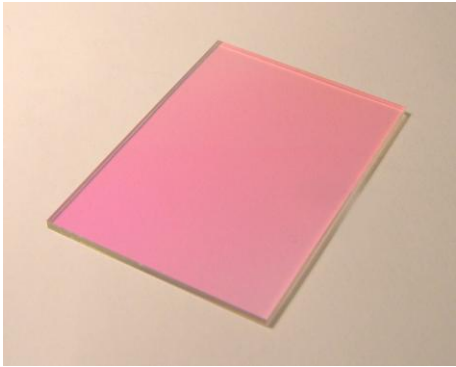
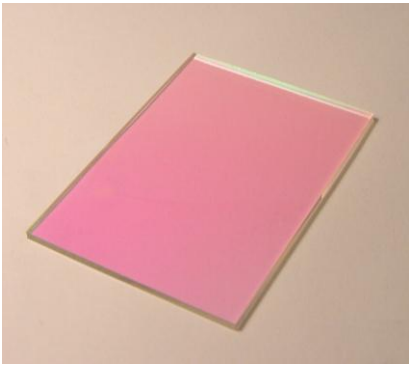
Light passes through the cube in the direction of the arrows. The arrows point toward the Anti-Reflective coatings on the Emitter and Exciter filters.

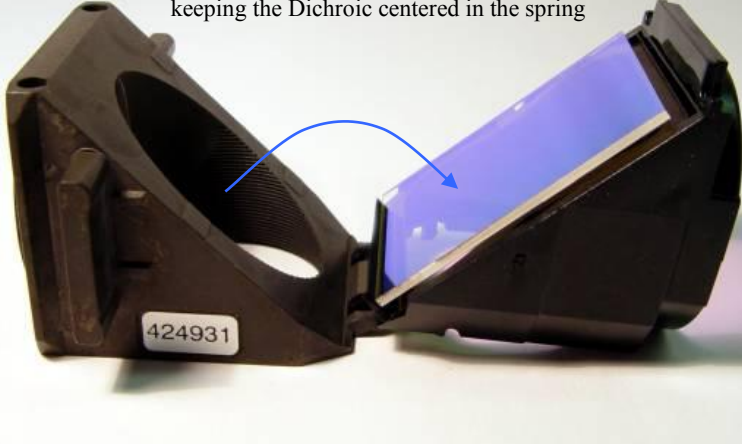
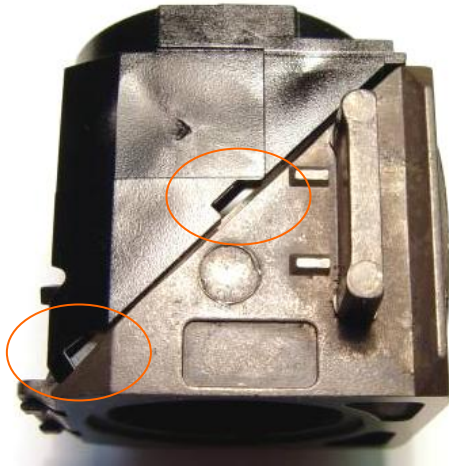
Note: The Dichroic Reflective coating must face the Exciter as shown in the cross section diagram.

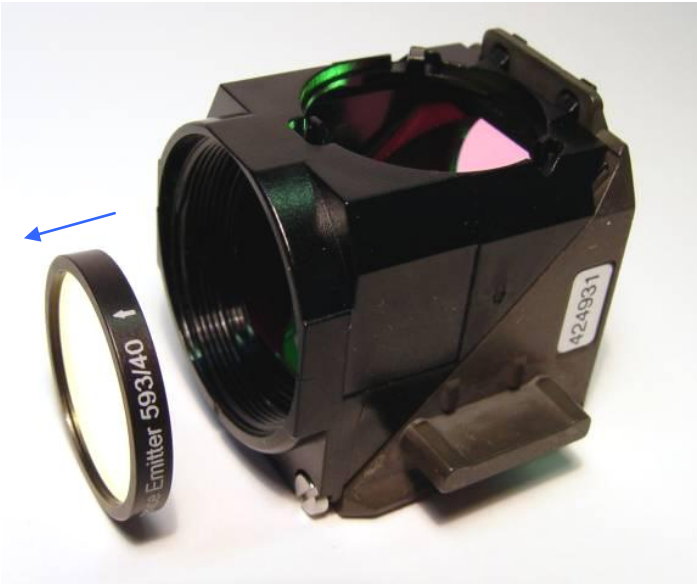


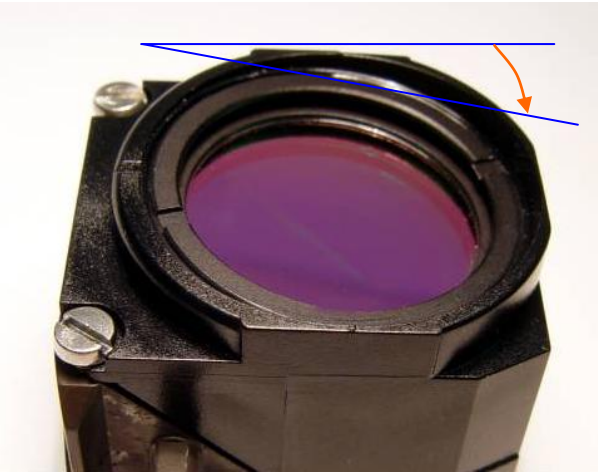
Step	Action
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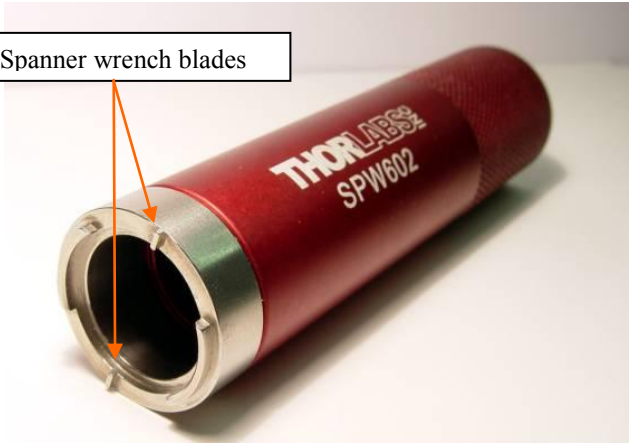
Step	Action
1.2.2	Remove the two Flat Head screws to separate the cube halves. Set the screws aside for reassembly later. Remove Screws 
1.2.3	Separate the cube halves to prepare for assembly of the Semrock filter set. Note that there are two prongs used to locate and hinge the cube housing and a metal spring clip that is used to position and secure the Dichroic filter during assembly. 

Step	Action
1.2.4	Assemble the Dichroic/Emitter half of the cube first. The Dichroic is positioned over the spring clip between the upright flanges at either end of the spring. Note that the clip locating tab is inserted into the notch at the side of the cube assembly.  The diagram shows a top-down view of a cube assembly. A dashed orange rectangle outlines the 'Dichroic Mounting Area'. An orange arrow points to a 'Locating Tab' on the top edge. Another orange arrow points to the bottom edge with the label 'Flanges face Up'. Note: Ensure the spring clip flanges face UPWARD.
1.2.5	Reflective “Coated Side”: The filter edge is concealed by the reflective coating and appears colored all the way to the edge. Anti-Reflective “Uncoated Side”: The filter edge appears uncolored. Reflective Side  Anti-Reflective Side 

Step	Action
1.2.6	Install the Dichroic over the spring clip with the Reflective coated side facing up. Center the filter within the mounting area between the mounting flanges. Once the Dichroic is centered, insert the prongs of the hinge into the Exciter half of the cube and carefully fold the cube together keeping the Dichroic centered in its mounting area. Apply gentle pressure to the cube halves during assembly to retain the Dichroic within the flanges of the spring clip. Note: The cube halves should fit together flush and without interference at either mounting surface. Note: DO NOT rest the cube assembly on the Dichroic filter during assembly. Carefully fold the cube together while keeping the Dichroic centered in the spring 
1.2.7	Check the alignment of the Dichroic and spring clip through the slots on the cube side. Ensure the spring clip locating tab is flush within the slotted opening and the Dichroic is aligned within the spring clip flanges. The spring clip should not be visible in the screw holes or interfere with screw placement. 

Step	Action
1.2.8	Fasten the cube halves together using the two flat head screws removed previously. Alternately tighten the screws until they are snug. Once snug, further tighten $\frac{1}{4}$ turn. 
1.2.9	Orient the Emitter with the arrow pointing away from the cube as shown below. 

Step	Action
1.2.10	Place the filter inside the Emitter mounting area with the arrow pointing up. Note that the filter shoulder side faces outward. 
1.2.11	Insert the filter retaining ring open side into the Emitter mounting area of the cube. Note that the cube threads are at an angle. This will require careful installation of the retaining ring to avoid cross threading. Using your fingers, carefully turn the ring while observing its position in the threads. Keep the ring level across the threaded area while allowing the ring to tilt as it threads inward. If the ring will not turn, it is not threaded properly – slowly turn the ring out and try again. Do not force thread the ring as it will turn freely if oriented correctly. Turn the ring inward until it starts to resist finger tightening. Note the angle of the retaining ring threads in the photo below. 

Step	Action
1.2.12	Locate the the THORLABS SPX602 Spanner Wrench. The spanner wrench blades are shown below. 
1.2.13	Insert the spanner wrench blades into the slots of the Emitter retaining ring. Tighten the ring snug against the Emitter filter. Once snug, tighten slightly further to secure. 

Step	Action
1.2.14	Orient the Exciter with the arrow pointing into the cube as shown below. 
1.2.15	Position the cube with the Exciter mounting area facing upward as shown below. Place the filter inside the Exciter mounting area with the arrow pointing in. Note that the filter shoulder side faces outward. 

Step	Action
1.2.16	Insert the retaining ring open side into the Exciter mounting area of the cube. Using your finger tips, carefully rotate the retaining ring to avoid cross threading. If the ring will not turn, it is not threaded properly – slowly turn the ring out and try again. Do not force thread the ring as it will turn freely if oriented correctly. Using the Spanner Wrench, tighten the ring snug against the Exciter filter. Once snug, tighten slightly further to secure. In the photo below, note the retaining ring shoulder side faces outward. 
1.2.17	Completed Zeiss ZHE Cube Assembly. 