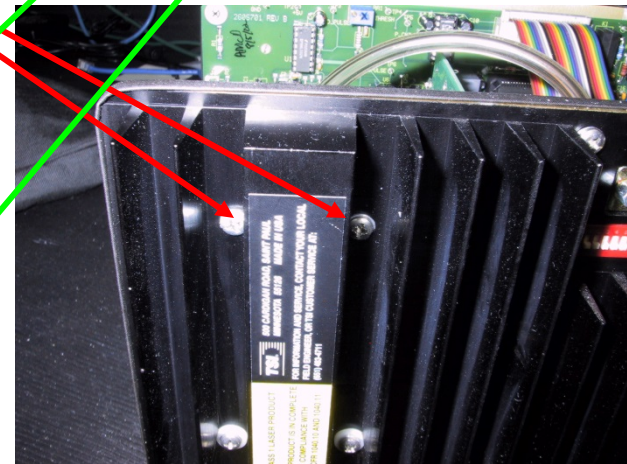
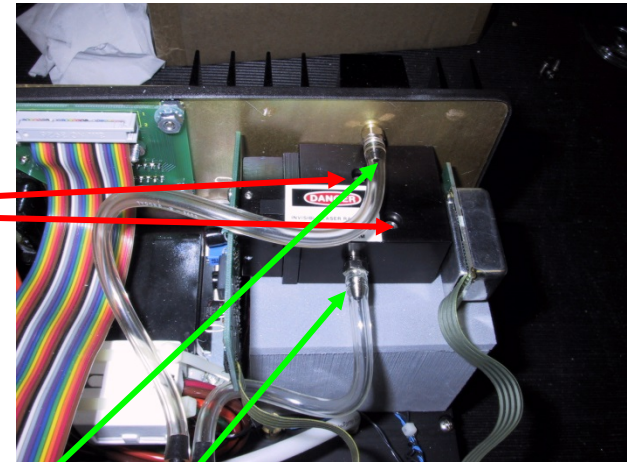


Step 0. Only do this if you have a way to calibrate the sample flow through the instrument (i.e., a flow calibrator (Gilibrator, BIOS, etc.) or a calibrated mass flow meter.

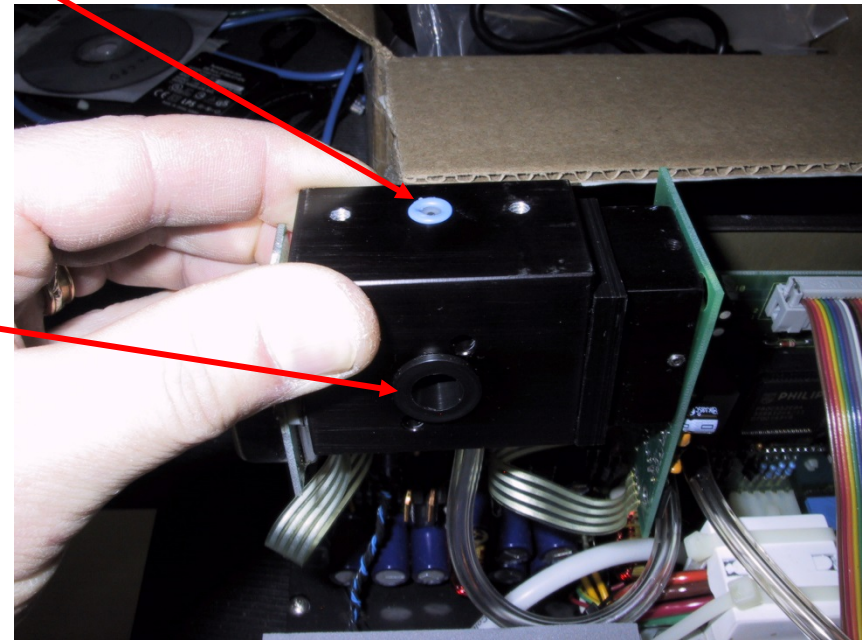
Step 1. Remove optics block from column

- Remove the 2 Allen head screws holding the optics block to the column
- Remove the 2 Phillips head screws holding the optics block to the back panel
- Disconnect the vacuum tube from the hose barb on the back panel
- Disconnect the vacuum tube from the hose barb on the optical block



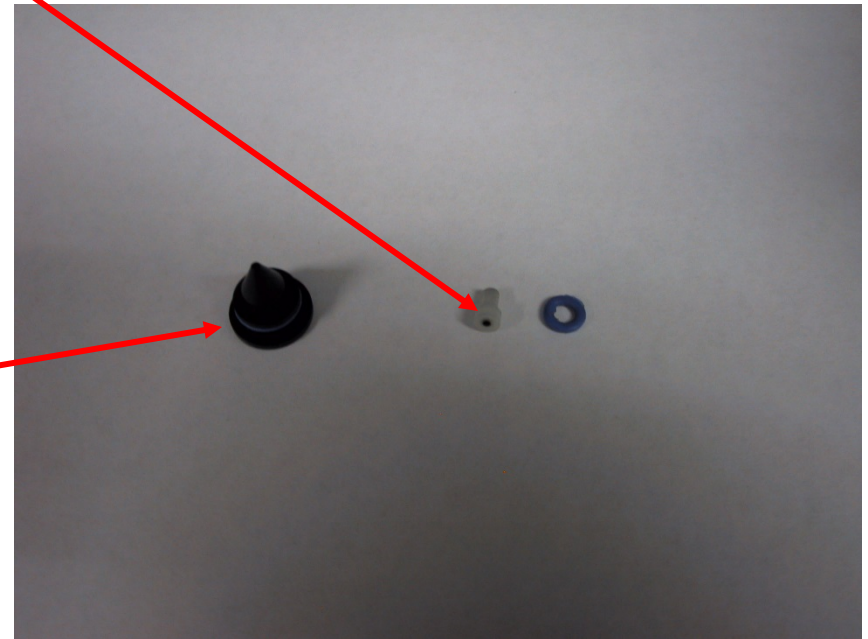
Step 2. Locate the critical orifice and the focusing nozzle

- The critical orifice (C.O.) is held in the block by a small blue o-ring. Remove the o-ring to access the C.O.
- The focusing nozzle is located at the bottom of the optics block. Pry the nozzle out with a small screwdriver or knife edge.
- Note: Please make a small orientation mark with a marker on both the focusing nozzle and on the bottom of the optical block so that you can reinstall it in exactly the same orientation as before.



Step 3. Remove the critical orifice and the focusing nozzle

- The critical orifice (C.O.) is a small sapphire annulus embedded in a plastic holder. The hole is only a few tenths of a mm in diameter. It controls the flow rate of air through the CPC.
- The focusing nozzle focuses the aerosol stream so that it shoots through the laser beam. It has a hole approximately 0.5 mm in diameter.



Step 4. Clean the C.O. and the focusing nozzle

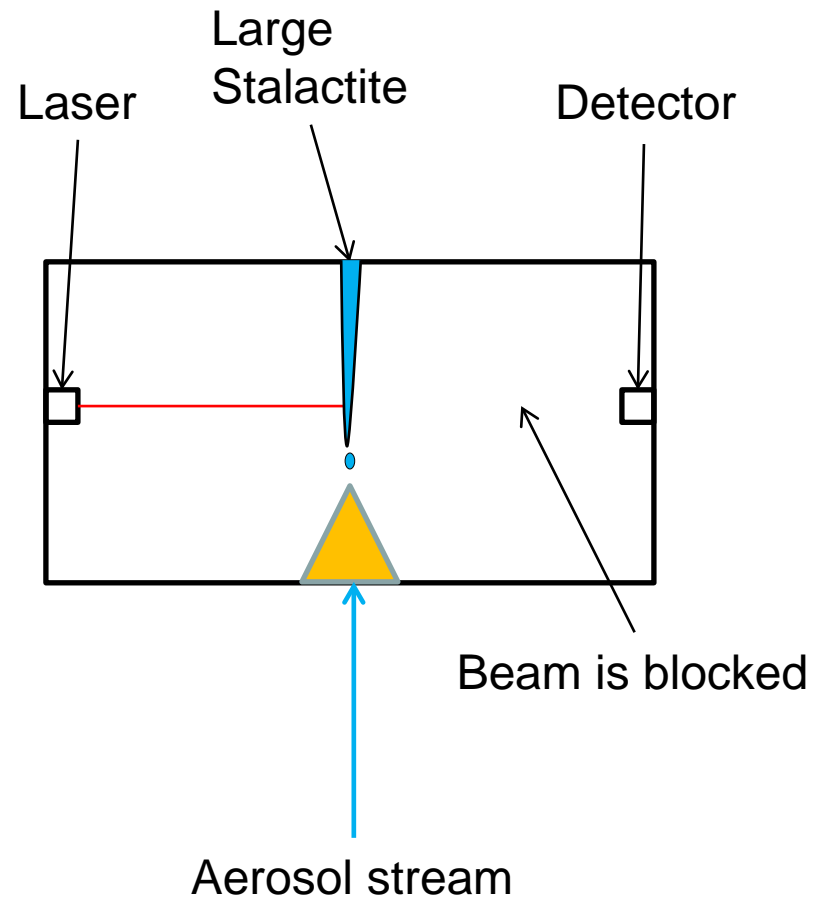
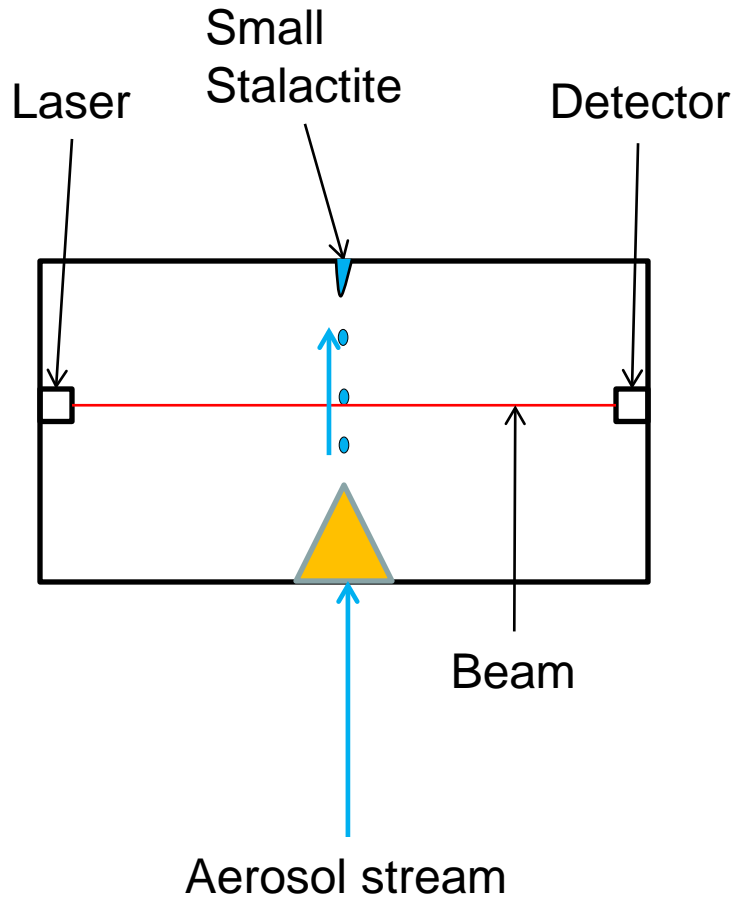
- Get a wooden toothpick, or some other small sliver of wood. This will be used to clean the C.O. and nozzle. It must be made of wood or another soft material because the C.O. can break, or the focusing nozzle can deform, especially if a hard metal pin is used.
- You may have to take a knife and shave some wood from the tip of the toothpick to make it slender enough to fit inside the C.O.
- Turn the toothpick gently in your fingers so that it rotates within the C.O. and the focusing nozzle orifice. This will clean off any deposits that have accumulated on the edges of the holes.

Remove the Stalactite (if present)

- Look into the optical block through the hole where the focusing nozzle was.
- If you can see a black stalactite sticking up, that is the problem (see next slide). It forms from the particles impacting and sticking on the opposite wall of the optical block.
- Use a cotton swab wetted slightly with alcohol, and touch the opposite side of the optical block. This should crush the stalactite and it will stick to the swab. Do not get alcohol on the sides of the optical block as that is where the lenses are.

Remove the Stalactite

Optical block



Step 5. Reassemble the unit

- Insert C.O., o-ring, and focusing nozzle into the optics block as before
- Re-attach tubing, and tighten Allen and Phillips screws to ensure a tight seal
- Make sure no electrical or tubing connections were broken or disconnected during the maintenance; if so, please repair or reconnect

Step 6. Perform a flow calibration

- Cleaning the C.O. will probably change the flow through the instrument. Use a flow calibrator (BIOS, Gilibrator, etc.) to calibrate the flow.
- The volume flow through the instrument should be approximately 1.0 lpm, assuming a critical (i.e., $\sim 0.5 \times$ atmospheric pressure) vacuum is applied to the unit.