

## HOW TO HANDLE OPTICS

### Installing new optics:

- Make sure you have
  - o label maker,
  - o sharpened graphite pencil,
  - o gloves and lens tissue,
  - o lens cleaning kit and dry air, if cleaning is necessary (no reason to clean factory new optics in general), and
  - o bright light for inspecting optical surfaces.
- Never directly touch an optic with your fingers; use gloves.
- Remove the optic from the container and write the full part number on the side using the graphite pencil (with some lenses this may not be possible).
- Put the optic in an appropriate mount and add a label with the full part number.

### Removing optics:

- Make sure you have
  - o the container to store the removed optic, and
  - o lens cleaning kit and dry air, if cleaning is necessary.
- Never directly touch an optic with your fingers; use gloves.
- Remove the optic from mount and put it into the container. Write the full part number on the container.

### Cleaning optics:

- First try to blow the particulates off with clean compressed gas. If using "dust-off," be sure to hold the can upright so that you don't blow liquid onto the optic.
- If chemical cleaning is required, always use optical quality chemicals such as the isopropanol and acetone that Kyle prepares for the in-vacuum work to clean optics.
- Try isopropanol first and acetone as a second resort. Caution, some coatings and substrates do not tolerate acetone.
- Try "drag wiping" first. If this does not remove the contaminant, fold a piece of lens tissue and hold it with hemostats. Be careful not to touch the central part of the tissue to which a drop or two of the solvent should be applied. Gently swipe the optic using only the springiness of the folded lens tissue to apply pressure to the surface.
- Inspect with a bright light and re-clean as required.

### Remember:

- Always make sure the optic is labeled properly.
- Never mount an optic with the idea to label it later. Don't start until you have a pencil and a label maker ready. Do not remove an optic without putting it back into a container.
- The preferred mounts for ISCT tables are U100-A (mirrors, beamsplitters & windows) and LMR1/LH-1 (lenses) for 1" optics; and U200-A and LMR2/LH-2

for 2" optics, respectively.

- U100-A and U200-A mounts come in right and left handed versions. Use the one which gives a clear edge for the through beam when using beamsplitters and windows.
- 3/4" inch posts for 4" beam heights (ISCT tables):
  - 2.625" high for U100-A mount on BA2 base
  - 2.250" high for LH-1 mount on mini-rail and U200A mount on BA2 base
  - 1.750" high for LH-2 mount on mini-rail
  - 2.125" high for LH-2 mount in BA2 base
- Make sure the correct (usually the high reflective) surface is facing the beam.
- Beamsplitters and windows have a wedge. You have to rotate the optic in the mount until the beam separates purely horizontally.
- Use plano-concave or plano-convex lenses when appropriate. If you have a relatively well collimated beam (with a large beam waist a long way from the lens) and you want to create a new beam waist (or virtual beam waist) near the focal plane of the lens, then the convex or concave side should face the collimated beam to produce minimum spherical aberration. If you want to relay beam waists of approximately the same size from one image position to another conjugate image position, then a double convex or double concave lens will cause minimum spherical aberration.
- The optics are stored in the cabinet next to the clean storage area at the entrance into the LVEA. This is not self-service; make sure you are allowed to take the optic you have in mind.
- Always make sure the optic is labeled properly.