CDCM (MRSEC) facilities laser safety standard operating procedure

CARBIDE (power: 40W, wavelength: 1030 nm, pulse duration: 290 fs, repetition: 100 KHz)

OPA (power: <2W, wavelength: 315 nm - 10 □m, pulse duration:290 fs, repetition: 100 KHz)

HIRO (power: 5 mW, wavelength: 206 nm, pulse duration:290 fs, repetition: 100 KHz)

White light (power: 1.1 mW, wavelength: 500 nm -1200 nm, pulse duration:400 fs, repetition: 100 KHz)

A. Initial preparation of the lab environment for normal operation
    a. Turn on the laser sign outside the lab.
    b. Write/read the operating wavelength on the LED board near the entrance door.
    c. Wear appropriate laser safety goggles for the laser wavelength.
    d. Enter the laser-exposure area enclosed by the curtain and make sure the curtain is closed.
    e. Verify only authorized users are inside the area and all wear appropriate eyewear.

B. Operation procedures for ultrafast lasers are as follows:
    a. Verify the beam blocks and any necessary optics are in place (or shutter is closed).
        i. For Carbide users, check shutter A (see picture);
        ii. For Hiro/white light, make sure the shutter B/C is closed (see picture).
        iii. For OPA users, if you use signal and idler output, make sure the flip mirror is in the right position (you can flip the mirror at this moment); check shutter D/E. If you use DFG output, check shutter F.
    b. If you use the beam propagating through the periscope (see picture), make sure the beam block is in place G. Make sure the flip mirrors in the downstream (see picture) are in the right position.
    c. Turn on the laser power supply and wait for it to warm up.
    d. Adjust the laser power as needed and enable the Carbide output when ready.
    e. Open the corresponding shutter or move the corresponding beam block. Do not misplace the beam block.
    f. Trace the beam propagation using an extra beam block or barrier. Block the beam to the upstream of the nearest optics as needed.
    g. Limit the power to the setup under 500 mW. This can be done by reducing the CARBIDE power/repetition rate in the program or using neutral density filter. EHS should be notified if more than 500 mW is being used.
    h. Remove the beam block before the periscope if applicable.

C. Shutdown procedures for ultrafast lasers are as follows:
    a. Close the Carbide shutter. Turn off the laser by Press the “Standby” button in the CARBIDE User app.
    b. Return the beam block to the original place (see section B) or close the corresponding shutter.
    c. Return the beam block before the periscope.
    d. Clear up all clutter, samples, and tools.

e. Wipe off the laser wavelength on the LED board.
f. Turn off the laser sign (leave the sign on if other lasers are still being used).

D. Emergency shutdown procedures:

a. Using the shutter key or shutter button in the program to close the Carbide shutter.

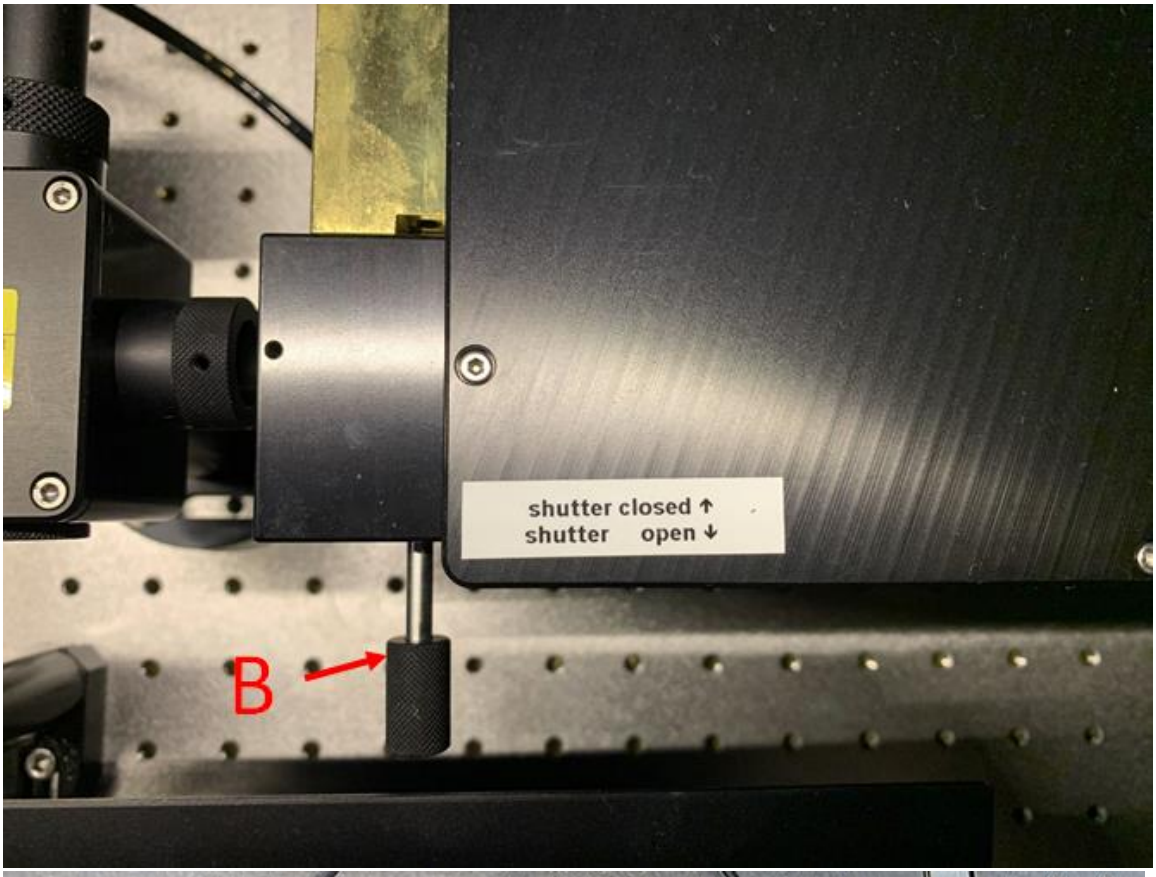
b. Press the “Standby” button in the CARBIDE User app; (alternative) Press and hold the Power ON/OFF button for 2-5 seconds on the laser rear panel (see picture).

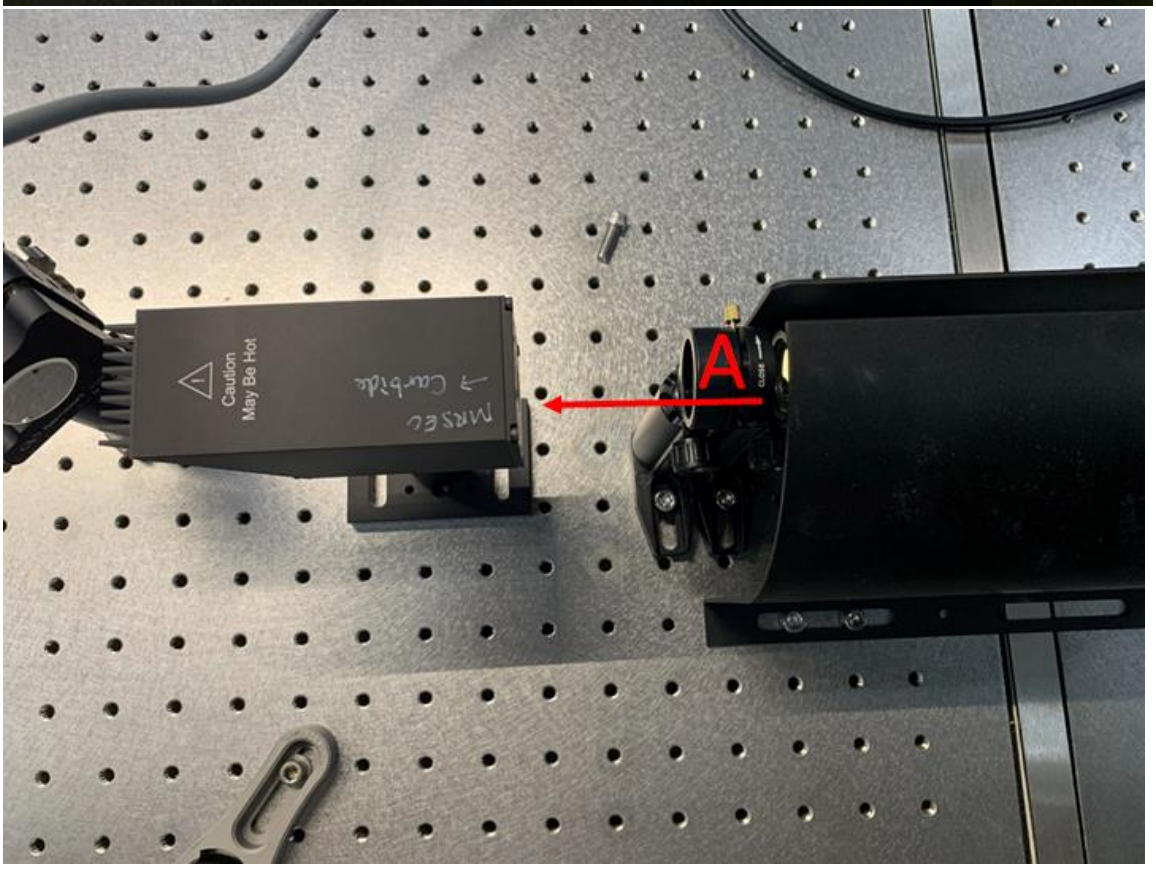
c. ****Switching off may take up to a minute, due to gradual decrease of currents and voltages. Disrupting power before complete shutdown procedure may damage the laser. It is only safe to unplug CARBIDE once it is in "Standby" state.***

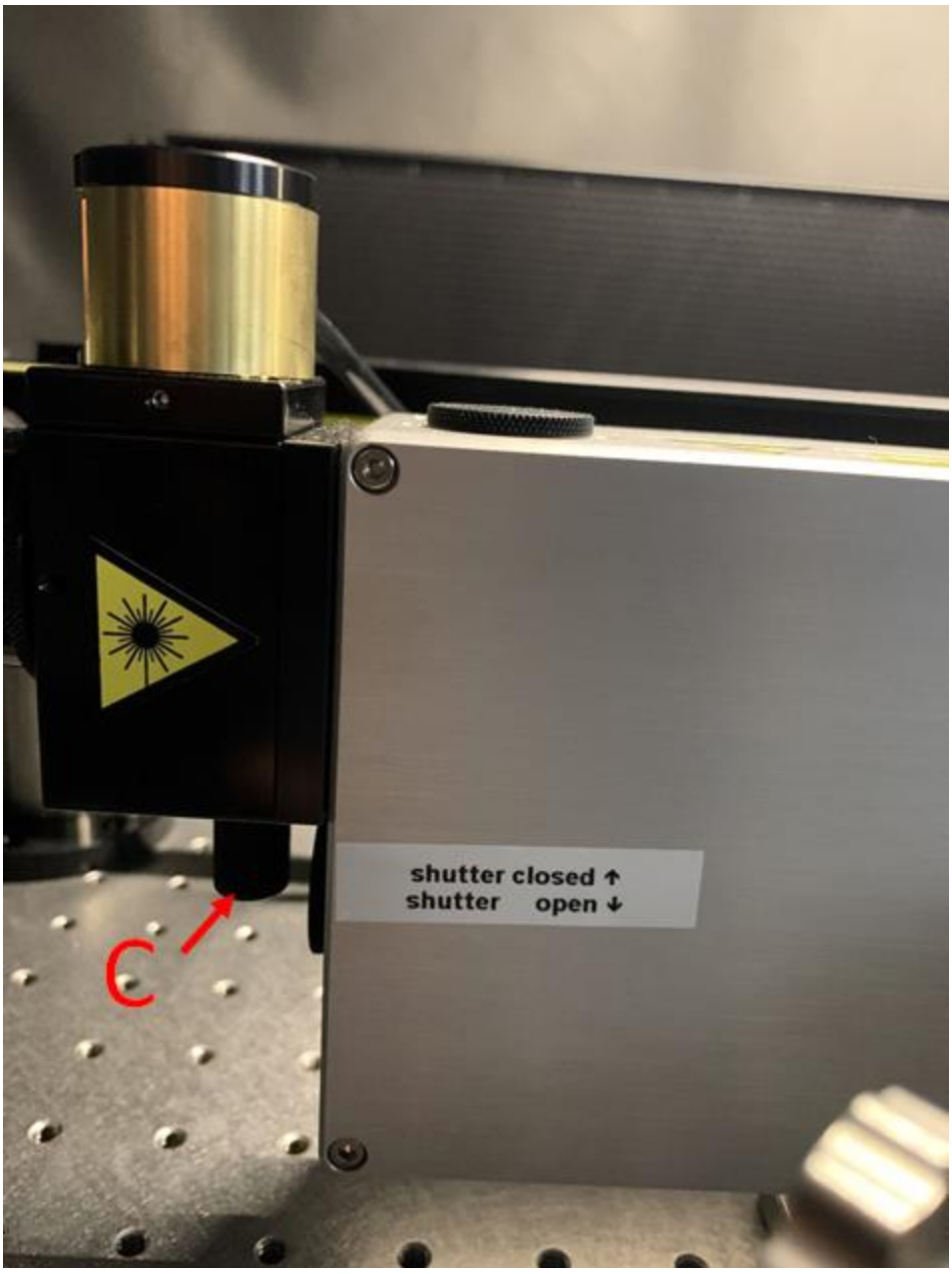
Violations of the operating procedure will result in suspension of the access to the facility. The PI will be noticed, and the duration of the suspension will be determined by MRSEC management and the PI.

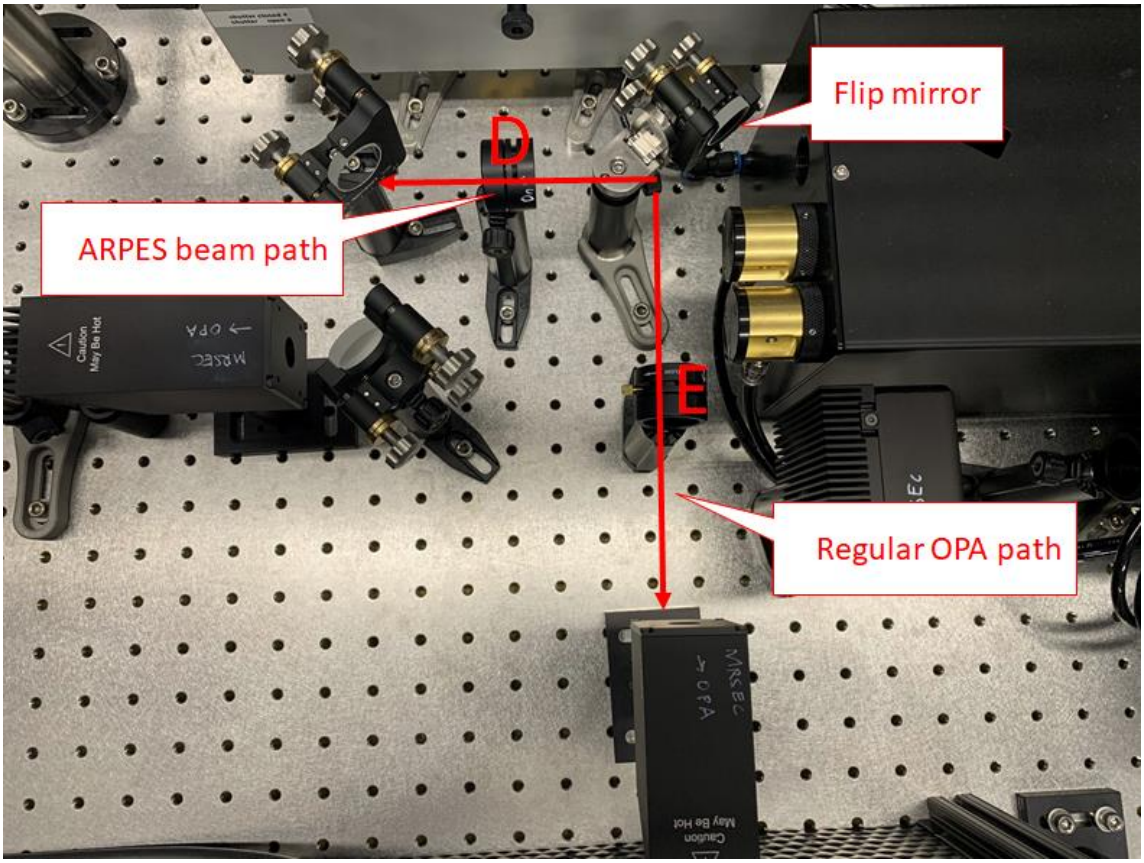
I have read and understand these instructions and procedures:

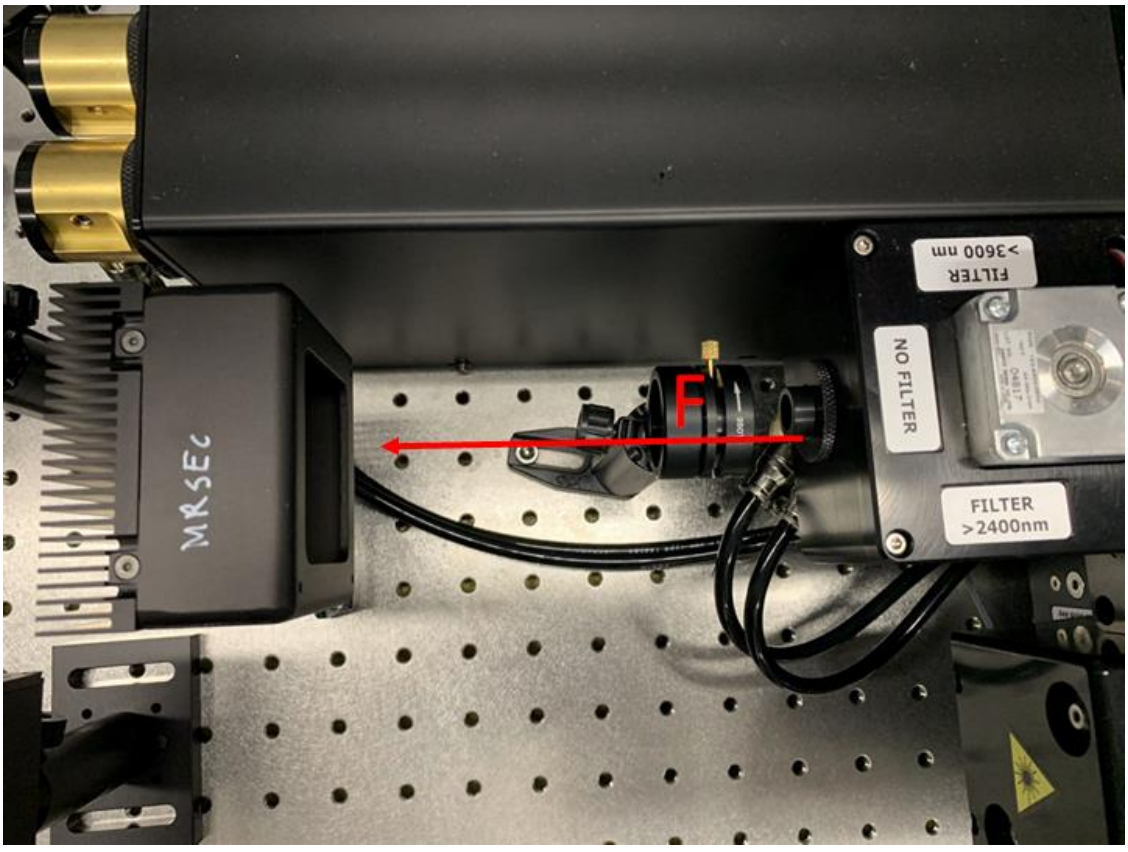
Print Name UT EID Signature Date

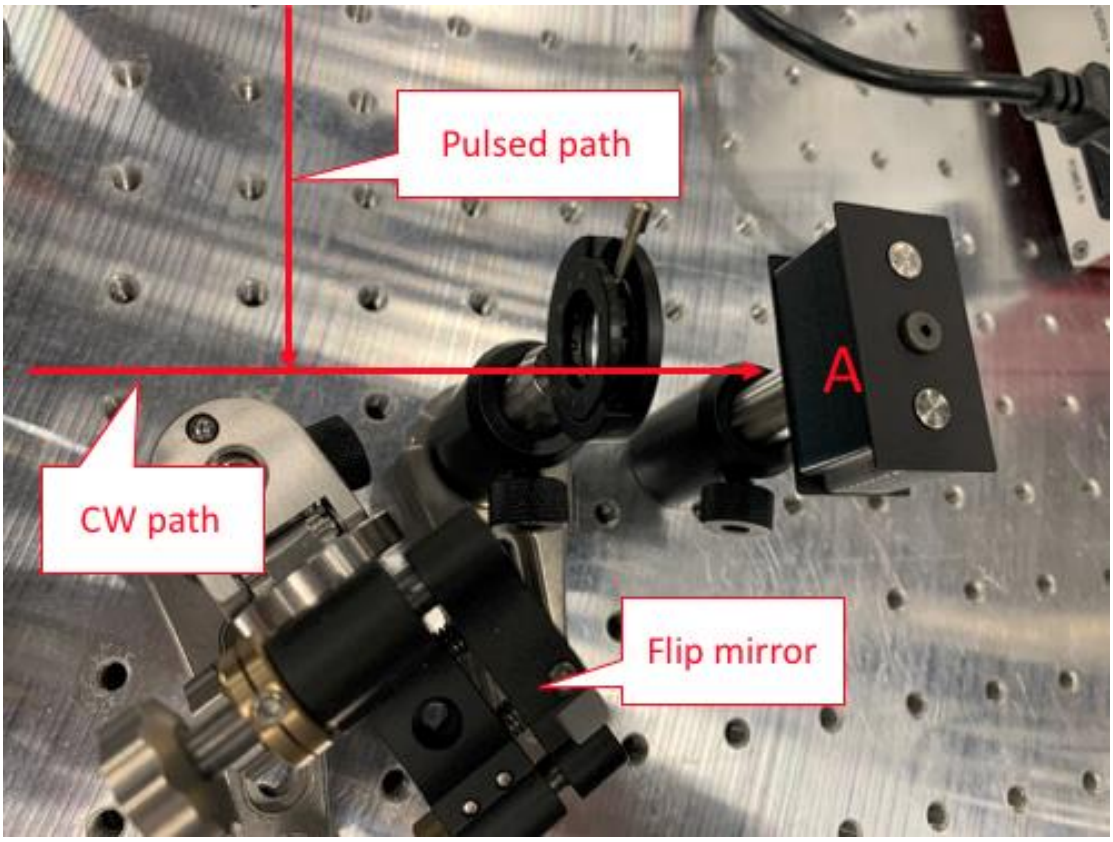

shutter closed ↑
shutter open ↓
B

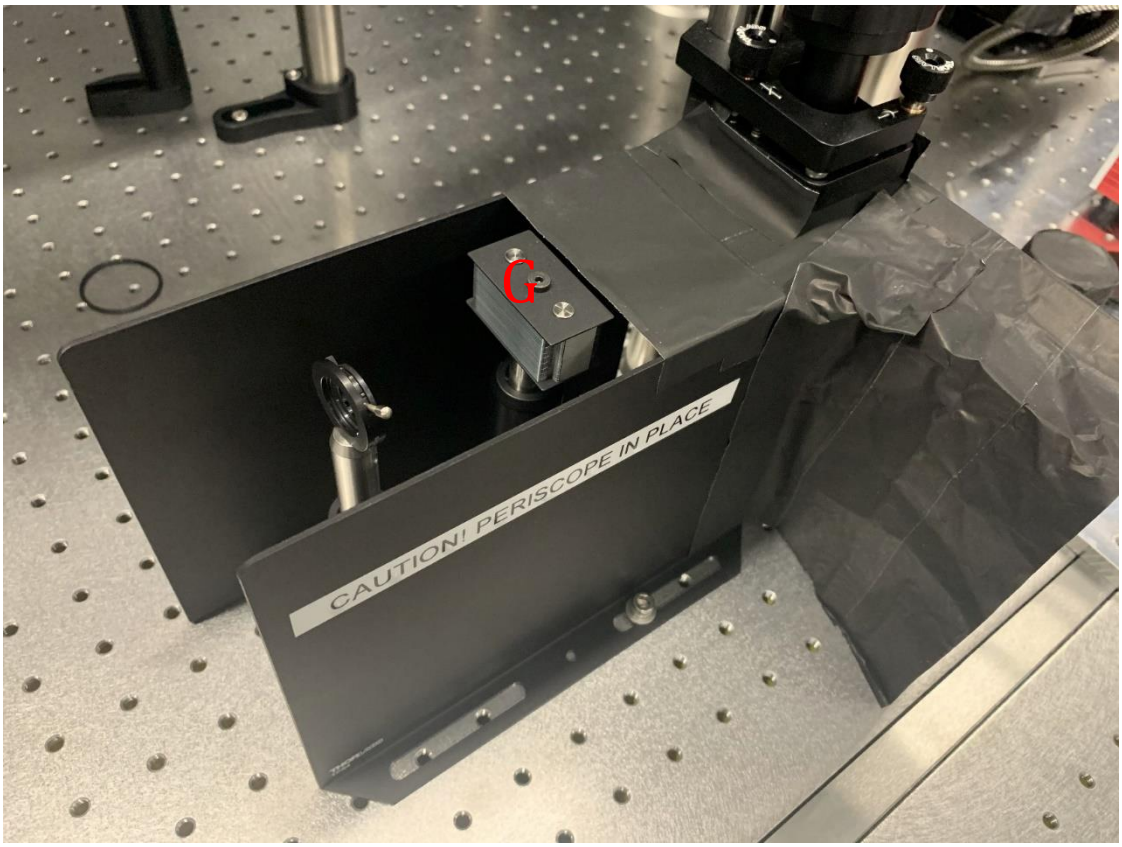

Caution
May Be Hot
A


shutter closed ↑
shutter open ↓
C


Flip mirror
D
ARPES beam path
E
Regular OPA path


F
NO FILTER
FILTER
>3600 nm
FILTER
>2400nm


Pulsed path
A
CW path
Flip mirror


G
CAUTION! PERISCOPE IN PLACE


Shutter state indicator
Emission indicator
Power on/off button
Shutter key
XB11
XB12
XS13
XB4
XB5
XB6
XB7
XB8
XB9
XS1
XB2
LIGHT CONVERSION
OUT