

# SOP - ZEUS TA3 Shooting procedure

## Before shooting

### Laser

1. Laser hazards sign on. The control box is in the laser control room.
2. Radiation hazard sign in TA3 is on
3. Kirk key in place

### 500 TW Compressor area

1. Compressor area: make sure the laser diode drop mirror and the pinhole before the compressor are out.
2. Compressor area: check the compressor vacuum ( $<1e-4$  Torr)
3. Compressor area: open the gate valves between the compressor turning boxes and the long tube
4. Disable the TB3 Newport stages via the software; power off the controller.
5. Power off the Oriel motor control boxes for the turning mirror in the compressor and TB3.
6. The door between the laser room and the diagnostics room should be locked all the time during shots on target. No one is allowed to enter into the diagnostic and experimental area from the laser room during shots on target.

### TA3 Target area

7. check the vacuum for the main chamber ( $\sim 1e-4$ )
8. make sure no one touches the 10" gate valve at the end of the chamber if the X-ray CCD tube is not connected; if connected, make sure the X-ray CCD tube has a good vacuum ( $<1$ Torr) before opening the 10" gate valve.
9. check the in/out of the first magnet. With the electron beam profile in before the magnets, keep the first magnet always in while shooting to protect the X-ray CCD
10. check the motor positions for the gas cell.
11. add ND filters for pointing camera, interferometry and showdography cameras.
12. check all beam blocks
13. make sure all the cameras are on external trigger and autosaving. The basler cameras will be automatically controlled with the python script.
14. make sure the lens and turning mirror for focal spot imaging is out.
15. Unplug the ethernet cable for alignment, focal spot cameras
16. Block the focal spot camera
17. Block the wavefront sensor
18. TA3: turn on gasses for the gas target.
19. Turn on the PMT high voltage. (-1500V)
20. Search the whole experimental area and the diagnostics room - no one should remain in those areas during shots on target which produce radiation.
21. The experimental and diagnostics room should be constantly monitored by video cameras and displayed on the monitors in the experimental control room.
22. During the experimental run no one is allowed to enter the experimental area or diagnostics room without the permission or knowledge of the TA3 link scientist or a person responsible for the conducting of the experiment
23. All the personnel participating in the experiment should wear radiation badges;
24. Open the gate valve in the experimental diagnostic room
25. Turn on the Stanford delay boxes.
26. Power on the gas valve control boxes.
27. Turn on the oscilloscope
28. Power off the Thorlabs control box

## After shooting

- Control room: kirk key box
- Control room: turn off the Stanford box, perhaps also unplug the external laser trigger cable.
- Control room: power off the solenoid controllers.
- Close the gate valve near to turning box 3.
- Warm up X-ray CCD if using it.
- Purge the gas lines and close the regulators.
- Turn off the purging pump.
- Turn off the PMT high voltage.
- Turn off all the cameras.
- Vent the chambers, see the procedures. (Normally stop the turbos first because it takes long time)





