

Laser Operations Safety Survey

Survey Date _____

Survey Team _____

Laser Location **TH 212**

Department **Physics & Astronomy**

Laser Supervisor **Dr.**

Laser System Details

| Class | Type of Laser | LUR# | Max. Power | Beam Diameter | Pulsed Energy/Max. FQ | Wavelength(s) (nm) | Note |
|-----------|-------------------------------|------------|--------------|----------------|-----------------------|---------------------|--------------------|
| 4 | Diode (Semi-Conductor) | 019 | 5 W | 2.25 mm | | 532 nm | CrystaLaser CL1064 |
| 3B | Diode (Semi-Conductor) | 023 | 0.13W | 5.6 mm | | 660, 785,830 | ThorLab |
| 4 | Diode (Semi-Conductor) | 024 | 1.5 W | 3.0 mm | | 532 nm | OEM MGL-F |
| | | | | | / | | |
| | | | | | | | |

Survey Results

| | |
|--|------------------|
| Results communicated to contact on this date → | General Comments |
|--|------------------|

| Laser Posting and Security | | Satisfactory | Not Satisfactory | N/A |
|----------------------------|---|--------------------------|--------------------------|--------------------------|
| 01 | Entrance properly posted <i>Guidance: All signs shall be conspicuously displayed in locations where they best will serve to warn onlookers.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 02 | Room security adequate <i>Guidance: Are engineering or administrative controls in place to prevent someone from entering the area while the laser is running and being exposed to the beam. Access is controlled.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 03 | Laser Status indicator outside room <i>Guidance: Is there a visible, audible and/or illuminated sign outside of the laser area that indicates that the laser is being activated or in use.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 04 | Laser class label in place | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 05 | Laser Hazard label in place | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 06 | Laser aperture label in place | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 07 | Key operation | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 08 | Protective housing in place <i>Guidance: Commercial laser products manufactured in compliance with Federal Laser Product Performance Standard (FLPPS) will be certified by the manufacturer and will incorporate these controls.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 09 | Barriers, gates, clearly delineate the laser use area? <i>Guidance: In rooms where non-laser activities take place, non laser users are protected from an escaping laser beam. The nominal hazard zone or laser hazard zone is clearly marked to prevent inadvertent access.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Notes/Comments | | | | |
| | | | | |
| | | | | |



Laser Operations Safety Survey

| Safety Systems | | Satisfactory | Not Satisfactory | N/A |
|----------------|--|--------------------------|--------------------------|--------------------------|
| 10 | Interlock on housing (okay if original equipment from manufacturer) <i>Guidance: If the housing has been removed for any reason the interlock must be checked. To check the interlock, remove the housing and try to actuate the laser. If the laser does not start the interlock is functioning. Please take safety precautions in the event the interlock is faulty and the laser activates during this test.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11 | Beam shutter present <i>Guidance: Does the protective housing have a beam shutter or attenuator that is capable of preventing access to laser radiation when the laser or laser system output is not required, as in warm up procedures</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12 | Emergency shutoff available <i>Guidance: Has the Emergency Shutoff been verified that it is functioning properly</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13 | Laser is secured to table | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14 | Laser optics are secured in place. <i>Guidance: Make sure the laser and its optics are secured so if the system is inadvertently bumped, beam won't move off its path. (This is to avoid stray beams)</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15 | Interlocks on barriers/gates segregating laser areas function. <i>Guidance: Engineering control to prevent unauthorized access to the laser use area while laser is operating because opening the barrier will automatically shut off the laser beam. Especially useful in multiuse rooms and where invisible wavelengths used.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Notes/Comments | | | | |
| | | | | |
| | | | | |

| Non-Beam Hazards | | Satisfactory | Not Satisfactory | N/A |
|------------------|---|--------------------------|--------------------------|--------------------------|
| 16 | No exposed circuits or wiring | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 17 | Electrical panels are unobstructed | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18 | High voltage power hazards present <i>Guidance: Prevent electrical shock, fires, and damage to equipment by replacing worn wiring or plugs and securing wires and circuits as required by electrical safety regulations. Make sure electrical panels remain easy to access for emergency shutoff. High voltage power supplies assoc. with laser systems have caused serious injuries and electrocutions.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 19 | Compressed Gas Cylinders and Cryogenic Liquids <i>Guidance: Make sure gas cylinders and cryogen dewars are secured.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 20 | Flammable solvents, dyes, cleaners are properly stored and labeled. <i>Guidance: The dyes and solvents used with dye lasers are usually toxic and are often flammable. Only trained personnel with appropriate personal protective equipment may handle these materials.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 21 | Slips, trips, and falls <i>Guidance: Check for excessive clutter, which poses a slip, trip, and fall hazard, as well as a potential fire hazard. Injuries are less likely to happen in an organized lab with space to move around without knocking items over.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Notes/Comments | | | | |
| | | | | |
| | | | | |



Laser Operations Safety Survey

| Safe Work Practices | | Satisfactory | Not Satisfactory | N/A |
|---------------------|---|--------------------------|--------------------------|--------------------------|
| 22 | Non-combustible materials used around Class 4 lasers | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 23 | A fire extinguisher is available in Class 3B and 4 labs. <i>Guidance: Class 4 lasers can ignite or cause off-gassing in combustible materials left in the beam path. Beam stops, barriers and curtains used with Class 4 lasers must be made of non-combustible materials. Keep an ABC fire extinguisher in lab.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 24 | Windows in the room covered (if any)? <i>Guidance: Are any of the lasers emitting wavelengths that are not absorbed by glass? If so, the windows must be covered to protect those on the other side.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 25 | Physical evidence of stray beams <i>Guidance: Check the area for burn marks and signs of smoke residue.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 26 | Aisle space is free of clutter and trip hazards. <i>Guidance: Slips, trips, and falls are common sources of injuries but can also result in inadvertent laser beam contact.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 27 | Special precautions for lasers emitting invisible wavelengths <i>Guidance: Use indicator cards to check beam path. Mark and/or interlock aisles where inadvertent contact with beam could occur. Post signs indicated lasers emitting invisible wavelengths may be present.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 28 | Lasers are not operated at eye level <i>Guidance: Make sure laser beams are not at eye level for a person casually walking into the room or, if seated, beams are not at eye level for operator or occupants at work stations.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 29 | Access blocked during alignments <i>Guidance: Barrier or curtain put up or door locked during alignments to prevent visitors from inadvertent contact with beam.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 30 | Beam stops present at end of all beam paths | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 31 | If beam crosses walkway, barriers and signs in place | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 32 | All beams are traced and dumped | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 33 | Optical bench free of unnecessary clutter and reflective items <i>Guidance: Check these items before each operation. Make sure interlocks and/or barriers are in place and working before operating the laser. Post clear and legible signs. Consider labeling beam stops and dumps for easy identification.</i> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Notes/Comments | | | | |
| | | | | |
| | | | | |
| | | | | |

Laser Operations Safety Survey

| Protective Equipment | | | | | Satisfactory | Not Satisfactory | N/A | |
|----------------------|---|-------------------|------------------|-----|--------------------------|--------------------------|--------------------------|-----|
| 34 | Skin protection available when using UV lasers <i>Guidance: UV lasers or excitation sources can pose hazards to skin. If the UV source can't be enclosed, skin covering, like lab coats, uv faceshield, gloves, etc., must be made available.)</i> | | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 35 | Laser eyewear is in good condition <i>Guidance: Eyewear and goggles must be kept clean near the operation and stored protected from damage and scratches.</i> | | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 36 | SOPs for eyewear and alignments are posted <i>Guidance: Post requirements for when laser protective eyewear must be worn and specify which type for each operation.</i> | | | | | | | |
| 37 | Laser eyewear is available for the laser outputs used. | | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| | Manufacturer | Model | Wavelengths (nm) | O.D | | | | |
| | Honeywell | Flex Seal Goggles | 190-532 | 7 | Manufacturer | Model | Wavelengths (nm) | O.D |
| | | | 10,600 | 5 | ThorLabs | LG10 | 190-534, 960-1064 | 7 |
| | | | | | " | " | 850-925 | 5 |
| | | | | | " | " | 925-1070 | 6 |
| | | | | | | | | |
| Notes/Comments | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Records | | | | | Satisfactory | Not Satisfactory | N/A |
|----------------|--|--|--|--|--------------------------|--------------------------|--------------------------|
| 38 | All users have completed the laser safety orientation with LSO <i>Guidance: Every person who may operate the laser without direct supervision must complete a general laser safety orientation with the Laser Safety Officer. This must be completed BEFORE unsupervised laser use begins.</i> | | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 39 | All users have had operational training with their lasers <i>Guidance: The Laser Supervisor (P.I.) or designated Laser Lab manager is required to train new laser users in the operation of the laser(s) they will use, and will include the specific protective measures and emergency procedures for their lab.</i> | | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40 | Purple laser safety binder is available <i>Guidance: The laser safety binder should be visible and available in the laser lab. Safety information including SOPs and a current list of authorized laser operators should be present.</i> | | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 41 | All Class 3b and 4 lasers are registered with LSO <i>Guidance: The COSE Non-Ionizing Radiation Committee (NIRC) must approve all registered Class 3b and 4 lasers before they may be put into service. Laser Use Permits must be renewed annually.</i> | | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 42 | Laser Use Permits for each active laser is current and posted. <i>Guidance: The COSE Non-Ionizing Radiation Committee (NIRC) must approve all registered Class 3b and 4 lasers before they may be put into service. Laser Use Permits must be renewed annually.</i> | | | | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Notes/Comments | | | | | | | |
| | | | | | | | |
| | | | | | | | |