Hazard/Laser Safety Report

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The information in this report pertains to the Photoacoustic system that is located in ETB306 as of 2018-02-12. The most recognizable features of the system are that it contains an interferometer, the optical table is propped up on rubber tires, and the laser is a class 3b red laser.

1. Potential Hazards

1.1 Laser

The laser for this system is a class 3b high power red laser. The primary concern in laser safety is the possibility of eye injury. Important components of the eye are susceptible to damage by laser light of all wavelengths from UV to IR for class3&4 lasers. However, red lasers have very good penetration depth to biological tissue and one needs to be very careful as a result. OD3 goggles are recommended for the red laser used in this system. However, it is possible other lasers will be introduced in the future so one should reassess the safety of the system and goggles required if a different laser is present. The second potential hazard is the damage of skin. However, it is considered to be less serious since most of the skin injuries can heal and the wavelength of this laser is not ionizing.

1.2 Voltage

The system is currently using a 12 DC supply. This is generally not considered a very dangerous voltage but one should still proceed with caution.

1.3 Fire

Fire may break out due to electrical hazards as well as high power laser hazards. The laser is not strong enough to quickly induce any fire, but presumably strong enough to do so with the right materials.

2. Standard Operating Procedures

Prior to operating the system, ensure that all of the required training is completed. Most importantly, the laser safety class provided by EOHSS must be taken.

Info to know prior to operation

- The laser in the system, the lasers power, and the intensity at the focus
- The OD of the goggles required to protect ones eyes from the laser
- Whether skin protection is required and what the risks are from skin exposure to the laser
- The current voltage source for the system, whether the source is safely contained, and the risks from being exposed to the voltage source

System specific operating procedure

1. Ensure the laser is contained by non-reflective surfaces in a box
2. Ensure all personal protective equipment is present, in good shape, and worn
3. Check that the laser warning sign is not covered
4. Make sure that people in the room have the correct eye wear as well or that there is no risk to them since the laser is contained
5. Place sample in the beam path
6. Check that the camera is operational
7. Cover the access point that was used to place the sample and camera to contain the laser
8. Turn on the laser
9. Make sure the laser is turned off prior to adjusting mirror, the sample, or the camera by disconnecting the power supply and observing a decrease in intensity of the light striking the camera

General Operating Procedures

- Obtain training for the laser by a senior lab personnel and ensure the system specific operating procedures are known

- All visitors must have protective eyewear and be accompanied by qualified laser personnel
- Minimum of 2 people are required for maintenance of high voltage lasers and maintenance can only be performed by qualified personnel
- Laser alignment should be conducted at the lowest possible power or using a separate low power laser
- Beams must propagate in the horizontal plane of the optica table when possible and avoid being at eye level with the beam by using a high chair or ensuring the beam is well contained
- Avoid skin exposure
- Remove reflective jewelry or belongings before working with high power lasers (class 3 and 4)
- When the output is idle for longer than a brief period the laser should be blocked at the source
- Maintain high ambient light in the room so pupils remain constricted so as to further reduce the possibility of eye injury
- Keep protective covers of lasers on other than during maintenance

3. Emergency Procedures

In all of the below cases dialing 88 on campus will be recommended. However, more serious injuries would warrant calling 911 and receiving help as soon as possible (serious burn, loss of eyesight, etc). Do contact someone near you for assistance if possible and needed. All incidents should have an incident report filed with the department as soon as possible.

3.1 Fire

For immediate assistance in the case of an accident or a fire, dial 88 on campus to receive help and so that your supervisor can be contacted. If there is a large fire, alert surrounding staff, pull the fire alarm, and evacuate the building in addition to calling 88. During evacuation do not use elevators, use the stairs.

3.2 Chemical Spill

In case of chemical spill that you know is safe to deal with, acquire the appropriate spill kit and contain the spill to prevent it from travelling across the floor or exiting the lab.

Cover the spill with the appropriate absorbent material. If the spill is too hazardous to deal with dial 88, tell everyone to evacuate the room, and evacuate yourself.

3.3 Laser Incidents

For accidents involving lasers, block the laser beam or turn off the laser to reduce/eliminate the possibility of causing further damage or harm to others. 88 should be called immediately, and the supervisor and EOHSS LSO designate should be contacted. All incidents should have an incident report filed with the department as soon as possible