LASER SAFETY MANUAL

Dartmouth College

Laser Safety Program
Environmental Health and Safety

Phone: (603) 646-1762 Fax: (603) 646-2622

Website: http://www.dartmouth.edu/~ehs/laser

DARTMOUTH COLLEGE LASER SAFETY MANUAL
TABLE OF CONTENTS

Reviewed: 2/29/16

I. INTRODUCTION

1.1 PURPOSE

The policies and procedures outlined in the Dartmouth College Laser Safety Manual have been established for the following purposes:

1. To protect the Dartmouth College community, the general public, and the environment from inherent hazards related to the use of lasers and their associated equipment.

2. To ensure that all researchers operate lasers and associated equipment in the safest and most efficient manner possible to reduce risks as well as to minimize chemical waste generated from laser usage.

3. To ensure that laser usage at Dartmouth College is in compliance with all applicable state and federal regulations.

With these objectives in mind, the College has implemented several measures aimed at ensuring the lowest possible exposure to laser related hazards. These measures include:

a. **Training –** All Dartmouth students and employees using laser equipment must participate in the laser safety program and be aware of laser related hazards.

b. **Experimental Design –** To the extent possible, experiments must be designed to minimize exposure to laser radiation and non-beam hazards.

c. **Laboratory Inspections –** Inspections are conducted to ensure that laser equipment is operated in a safe manner and that appropriate personal protective equipment is available for use.

1.2 SCOPE

The Dartmouth College Laser Safety Manual applies to the use, management, acquisition, transfer, storage, and disposal of all lasers owned and operated by Dartmouth College and its affiliates for research purposes. The policies and procedures presented in this manual are based upon recommendations provided by the American National Standard for Safe Use of Lasers (ANSI Z136.1-2014), as well as applicable state and federal regulations.

Please Note: This manual does not provide guidance for the use of lasers in a clinical setting. As a result, the Standard for Safe Use of Lasers in Health Care (ANSI Z136.3) should be consulted prior to conducting any research or clinical work involving laser use in medical applications.

II. PROGRAM ADMINISTRATION

2.1 RADIATION/LASER SAFETY STAFF

Radiation/Laser Safety Officer:	Katrina Morgan
Asst. Radiation Safety Officer:	Jason Angell
Asst. Radiation Safety Officer:	Corey Martin

2.2 RADIATION/LASER SAFETY COMMITTEE

Radiation/Laser Safety Committee

The Radiation/Laser Safety Committee is a standing committee that reports to the Provost of Dartmouth College and is made of up members of the Dartmouth research community. Members must have formal experience with radiation and laser producing equipment and are tasked with formulating policies and procedures governing all research utilizing radiation at Dartmouth College. The committee will meet a minimum of four times a year, and written records will be maintained for all meetings and activities pertaining to the committee. Responsibilities are as follows:

1. To establish, revise, and maintain internal policies and procedures to ensure compliance with applicable state and federal regulations.

2. To evaluate annual reviews of the Laser Safety Program conducted by the Radiation/Laser Safety Officer to assess and ensure compliance with the program.

3. To review and authorize research involving radiation/laser use.

2.3 EMERGENCY CONTACT INFORMATION

Environmental Health & Safety

Office Address:	37 Dewey Field Road (HB 6216)
Phone (Work Hours):	(603) 646-1762
Pager (After Hours):	(603) 442-1058

III. LASER CLASSIFICATION

In the United States, lasers and laser systems are divided into hazard classes based on the laser's potential to cause immediate injury to the eyes or skin upon direct exposure to the beam and/or secondary hazards related to the laser's composition. These hazard classes are often directly correlated with the power and wavelength of the emitted beam.

3.1 CLASS I, II, AND IIIa LASERS

Class I (IEC Class 1)

Class I lasers do not emit harmful levels of radiation when operated under normal, manufacturer recommended conditions. Class I lasers are exempt from control measures (see Section V) and special training when used in an unaltered state and in the absence of optical enhancement devices (e.g. binoculars, microscopes, etc.).

Class II (IEC Class 2)

Class II lasers emit a low-powered beam that falls within the visible light spectrum. While typically not acutely hazardous at a normal state, chronic exposure to Class II lasers can damage the eyes. In general, the natural blink reflex of the eye is sufficient for protection from damage by Class II lasers. Class II lasers are exempt from control measures (see Section V) and special training when used in an unaltered state and in the absence of optical enhancement devices (e.g. binoculars, microscopes, etc.).

Class IIIa (IEC Class 1M, 2M, and 3R)

Class IIIa lasers are not typically hazardous when viewed briefly with the unaided eye; however, severe eye damage may result if viewed through optical enhancers (e.g. binoculars, microscopes, etc.). Class IIIa lasers are exempt from control measures (see Section V) and special training when used in an unaltered state and in the absence of optical enhancement devices (e.g. binoculars, microscopes, etc.). Power: 1-5 mW.

Class IIIb (IEC Class 3B)

Class IIIb lasers will cause eye injury if viewed directly or by specular reflection. Class IIIb typically do not pose a diffuse reflection or fire hazard. Class IIIb lasers require specific safety control measures (see Section V for the appropriate hazard controls). Power: 5-500 mW.

Class IV (IEC Class 4)

Class IV laser beams pose eye, skin, and fire hazards. Eye and skin injuries can result from either direct or indirect exposure to the beam. Non-beam hazards exist for certain laser types. Class IV lasers require extensive safety control measures that must be adhered to at all times (see Section V for appropriate hazard controls). Power: > 500 mW.

IV. Laser Use Policies and Responsibilities

4.1 Radiation/Laser Safety Officer Responsibilities

1. Ensure compliance with Federal, State, and Local regulations governing laser use
2. Implement and direct the Dartmouth College Laser Safety Program
3. Maintain an inventory for all Class IIIb and Class IV lasers
4. Conduct periodic inspections of laser equipment and facilities. Inspections include:
    a. Evaluation of record keeping and posting requirements
    b. Inspection of PPE, safety features, and laser equipment
    c. Overall assessment of compliance with the Laser Safety Program
5. Provide basic laser safety training for all employees working with Class IIIb and Class IV lasers. Training must include:
    a. Defining laser classification
    b. Outlining the dangers associated with laser use
    c. Explanation of proper safety procedures and PPE
    d. Dartmouth College policies on laser use
    e. Emergency procedures and reporting policies
6. Suspend any research involving laser use that poses an immediate danger to the health or safety of the user, community, or environment (Any such event should be immediately reported to the Radiation/Laser Safety Committee for review)
7. Suspend all activities involving laser equipment in the event of repeat or negligent noncompliance with the Laser Safety Program by a PI or laser operator
8. Respond to, investigate, and report laser accidents or emergencies

4.2 Principal Investigator Responsibilities

1. Submit **New Laser Registration Forms** for Class IIIb and IV lasers to the RSO
2. Establish lab specific procedures to ensure that laser equipment is properly labeled and securely stored
3. Appoint a Laser Training Manager to provide equipment-specific laser training
4. Conduct periodic assessments of safety
5. Notify the RSO prior to the purchase of each new piece of laser equipment
6. Inform the RSO of all rooms in which laser equipment is stored or used
7. Inform the RSO of all personnel who may use or have access to laser equipment
8. Designate a lab "contact person" who will be responsible for laser use compliance
9. Ensure that required laser safety postings are in place
10. Ensure that only officially trained and registered laser users operate laser equipment
11. Obtain approval from the RSO before laser equipment is disposed of or transported off campus
12. Consult with the RSO when changes in the existing use of equipment may result in increased risk of exposure or associated hazard
13. Report to the RSO in the event of an accidental exposure or injury due to laser use

4.3 Laser Operator Responsibilities

1. Comply with Dartmouth College and lab specific procedures governing laser use
2. Complete all required safety training prior to operating laser equipment
3. Ensure that all laser equipment is secured against unauthorized access
4. Perform and document periodic safety checks on all laser equipment
5. Wear appropriate PPE (lab coat and safety goggles, at a minimum)
6. Report equipment problems or accidental exposures to the lab supervisor/PI and RSO
7. Report any unsafe conditions related to laser equipment or laboratory environment to the lab supervisor/PI and RSO

4.4 Acquisition, Transfer, and Disposal Policy

Acquisition

All PIs who wish to purchase a Class IIIb or Class IV laser must notify the Radiation/Laser Safety Officer (RSO), the Radiation/Laser Safety Committee (RSC), and submit the following information to the RSO for review:

1. A completed **New Laser Registration Form**
2. A laboratory diagram including the intended location of laser equipment, warning postings/lights, protective curtains and PPE, cryogenic tanks, etc.
3. A list of available PPE, safety goggles, and monitoring equipment

Prior to review and approval by the RSC, the RSO will conduct an initial inspection of the facilities/laboratory space that will house the laser equipment. Authorization for laser use will be based upon the following inspection criteria:

1. The PI must have completed Laser Safety Training and must provide documentation of previous laser use experience
2. All lab personnel who will be operating the laser equipment must have completed Laser Safety Training and Equipment-Specific Trainign prior to operation
3. The lab must be posted with a "Danger, Laser Radiation" sign
4. An equipment maintenance log must be established and maintained for lasers that present significant non-beam hazards
5. Adequate PPE must be readily available in the laboratory
6. Operating and safety procedures must be available for review

Please Note: The RSO and RSC may deny authorization if the facilities, operating procedures, or safety protocols are deemed substandard, or if the PI or lab personnel are unable to provide sufficient evidence of appropriate training or experience. Failure to provide the documentation listed above will result in a delay or denial of laser use authorization.

Transfer

In the event that a Class IIIb or Class IV laser is transferred from one PI to another PI at Dartmouth, the Radiation/Laser Safety Officer must be notified through completion of a **Laser Transfer Form**. The transfer cannot proceed without the approval of the RSO and RSC.

Disposal or Transfer Off-Campus

In the event that a Class IIIb or Class IV laser is sold, disposed of, or transferred to a laboratory not affiliated with Dartmouth, the RSO must be notified through the completion of a **Laser Disposal Form**. Following notification, the RSO will help coordinate the disposal by:

1. Decommissioning the laser equipment
2. Evaluating and coordinating hazardous waste disposal (as appropriate)
3. Updating the master laser inventory (once the equipment is off-campus)
4. Re-evaluating the safety requirements for the laboratory after disposal

4.5 Protocol for Laser Modification And Fabrication

Any anticipated modification to laser equipment that has the potential to increase laser classification or result in additional laser safety hazards requires Radiation/Laser Safety Officer (RSO) approval prior to implementation. To initiate this approval process the lab supervisor/PI must submit a completed **Laser Modification/Fabrication Form** to the RSO that explains the modification and provides a justification for its necessity.

In the event that a laser device (for which a CDRH accession number does not exist) will be constructed in the laboratory, both the RSO and RSC must be notified formally using **Laser Modification/Fabrication Form.** The written notification must include the PI, Laser Training Manager, Intended Wavelength and Power, Lasing Media and Power Source that will be used.

Please Note: Certain modifications to laser equipment may require inspection of the equipment and/or lab space prior to RSO approval. With this in mind, please allow sufficient time for the RSO, or a third party, to conduct an appropriate review of the proposed modifications. **No temporary or "ad hoc" arrangements will be permitted without RSO approval in consultation with the RSC chair.**

4.6 COMPLIANCE POLICY

Dartmouth College is committed to complying with all Federal, State, and Local regulations regarding the safe use of laser equipment. To this end, the Laser Safety Manual serves as a guide to protect researchers, the public, and Dartmouth College from laser related accidents and hazards. The Radiation/Laser Safety Committee maintains and enforces the following compliance policy within the Laser Safety Program to describe potential violations that lead to non-compliance with regulations. In cases of non-compliance or gross negligence pertaining to laser safety, the RSO and RSC reserve the right to limit or cease laser use by the offending laboratory. Please review the following non-exclusive list of potential violations of the Laser Safety Program:

Non-Compliance Violations:

1. Unsafe work practices that demonstrate a disregard for the safety of others in the lab
2. Failure to correct known electrical or mechanical hazards
3. Deliberate circumvention of engineering controls without prior approval from the RSO and/or failing to notify other lab personnel prior to altering these controls
4. Lack of proper personal protective equipment
5. Not reporting laser accidents to Dartmouth EHS or the RSO immediately
6. Loss of a portable Class IIIb or Class IV laser
7. Failure to properly limit unauthorized access to laser equipment (especially Class IV equipment)
8. Obstructed or cluttered laser work areas
9. Non-functioning warning lights
10. Deliberate manipulation of laser equipment that results in an increase in its laser classification without prior approval from the RSO
11. Any deliberate misuse that places the laser user or other individuals in harms way

Remediation Actions:

Any evidence of the above violations will result in the immediate suspension of laser-use authorization until all violations are corrected. The power source of the laser will be deactivated using lock out/tag out principles and equipment access will be restricted.

V. HAZARD CONTROL MEASURES

5.1 CONTROLS FOR CLASS I, II, AND IIIa LASER SYSTEMS

When used under manufacturer's recommended conditions, Class I, II, and IIIa laser systems pose relatively limited risk to the operator, environment, or other lab personnel. However, since the hazards are not negligible, the following requirements apply:

1. PIs are responsible for ensuring that all operators receive appropriate safety training
2. Exposure to laser radiation must not exceed the Maximum Permissible Exposure (MPE) as defined by ANSI Z136.1-2014
3. Lasers must be posted with warning labels appropriate for the laser classification
4. Any system modification or maintenance work that has the potential to increase the laser's classification must receive approval from the RSO prior to implementation
5. Use of these laser classes with secondary optical enhancement devices (e.g. telescopes, microscopes, binoculars, etc.) must first be reviewed by the RSO and RSC.

5.2 CONTROLS FOR CLASS IIIb AND IV LASER SYSTEMS

Due to the potential health and safety risks posed by Class IIIb and IV lasers, additional safeguards must be in place to minimize the hazards associated with operating such equipment. The following sections outline the procedural, regulatory, and engineering controls that aim to attenuate the risk of operating Class IIIb and IV laser systems.

5.2.1 CLASS IIIb AND CLASS IV LASER SYSTEM USE POLICY

Minimal Requirements for Class IIIb and Class IV Lasers Use

1. The laser/laser system must be housed in a secured room that is under lock and key when the laboratory is unoccupied.
2. Non-laboratory personnel shall not have access to the controlled area in the absence of a laboratory approved laser operator.
3. The room housing the laser must be posted with a laser warning sign and an **Essential Information on Laser Safety** poster (provided by EHS).
4. Adequate bench space must be marked for portable laser-equipment use.
5. Written operational procedures must be readily accessible in the laboratory.
6. If the entire beam is not enclosed or if a limited open-beam exists, the lab supervisor/PI should designate and clearly label a Nominal Hazard Zone (NHZ).
7. Appropriate protective eyewear must be worn whenever the laser is in operation (see Section 5.3).

Additional Requirements for Class IV Laser Use

1. All laboratories with a Class IV laser must be equipped with an illuminated warning sign that indicates when the equipment is energized.
2. Engineering controls must be in place and used. This includes the use of fail-safe interlocks to prevent unexpected entry into the controlled laser area.
3. Laser-rated curtains must be in place and utilized when a laser with an open-beam is energized.
4. The beam path must be clear of all specular reflective surfaces and combustible materials.
5. The beam path must be terminated by a non-combustible, non-reflective barrier or beam stop.
6. Only authorized, trained individuals should operate or service the laser.

5.2.2 Posting and Control Area Requirements

Control Area Requirements

A laser control area is established to contain laser related hazards to a confined environment in order to minimize exposure risk to other lab members or Dartmouth personnel. For this reason, Class IIIb and IV lasers may only be operated in spaces that are access limited and clearly posted. The RSO is responsible for defining the parameters of the laser control area after reviewing the laser use proposal provided by the PI/lab supervisor and conducting a survey of the laboratory. The RSO must be consulted before any alterations are made to the laser control area.

Class IIIb Laser Control Areas

1. Access must be limited such that only authorized personnel are permitted to operate the laser equipment.
2. Appropriate warning signs must be posted in an obvious, unobstructed manner.
3. Areas must be managed and supervised by an individual with proficient knowledge of and experience with laser safety practices.
4. Areas must be arranged to allow for rapid egress by laser operators in the event of an emergency.
5. All windows and doors that open to spaces exterior to the laser control area must be covered or filtered in a manner sufficient to reduce the transmitted laser radiation to levels below the maximum permissible exposure for unprotected eyes.
6. Reflective materials may only be used when a suitable alternative does not exist and must kept away from the beam path when not actively being used.
7. Appropriate PPE must be readily available at all times and must be worn when the laser is powered (see Section 5.3).

Additional Class IV Laser Control Area Requirements

A Class IV laser control area requires all Class IIIb control measures plus the following:

1. Entry into the Class IV laser control area must be regulated by an interlock system that is designed to prevent unprotected personnel from unexpected exposure to laser radiation. Often interlock systems are designed to prevent access to the control area when the laser is being operated or terminate the laser beam when the door is opened. This option represents the preferred method of control and should be used in the majority of cases.

OR

2. The control area is designed such that barriers (screens, curtains, etc.) block laser radiation and ensure that levels do not exceed the MPE at the point of entry. If this method is used, a visible, illuminated sign must be present at the doorway to indicate when the Class IV laser is energized and being operated. Access to the room while the laser is energized requires control area specific entry procedures detailing PPE, communication, routes, etc. This option requires the explicit approval of the RSO and RSC and will only be considered on a case-by-case basis. Pulsed UV or IR Class IV laser systems are particularly hazardous and should be interlocked.

Control Area Posting Requirements

Class IIIb and Class IV laser control areas must be posted to indicate the hazards associated with laser use as defined by the ANSI Z136.1-2014 standard. General laser hazard signs must be posted within the control area, and each control area entry point must be posted to indicate the presence of the laser and whether the laser is energized. Additionally, all laser operators must have access to a readily available copy to the laser specific SOP within the control area.

5.2.3 Engineering Controls

Engineering controls are aimed at attenuating the hazards associated with laser use in a manner independent of the operating procedures and personal protective equipment. These control measures include protective housing, interlock systems, beam stops or attenuators, warning systems, remote firing mechanisms, filters, barriers and curtains, etc. Engineering controls should be utilized in laser control areas, where feasible, and as agreed upon by the PI, RSO, and RSC.

Barriers and Curtains

Barriers, screens, and curtains should be used at entry points, doorways, windows, and other gaps in the laser control area to prevent Class IIIb and Class IV laser radiation from exiting the control area at levels above the MPE. Selection criteria should consider both direct and scattered beams, flammability, and other barrier integrity factors.

5.3 Personal Protective Equipment

Eye Protection

Appropriate eye protection must be stored in a well-marked, readily accessible location in all Class IIIb and Class IV laser control areas and must be worn anytime a Class IIIb or Class IV laser is in use. Class I, II, and IIIa lasers generally do not require laser rated eyewear, except when optical enhancement devices are used or if prolonged direct viewing is necessary or expected. Selected and supplied eyewear must be rated to protect against both direct and diffusely scattered beams and must be in compliance with all requirements outlined in ANSI Z87.1-2010. Eyewear must be maintained in good, working condition and inspected prior to each use. If laser protective eyewear displays any sign of damage or defect, a suitable replacement must be found or purchased before use of the laser can continue.

Skin Protection

Beam stops, protective housing, barriers, curtains, and other engineering controls should provide the first line of defense against skin exposure. In the event that UV radiation is anticipated, UV protective clothing and face shields must be provided and worn when the laser is in operation. To further minimize exposure to UV radiation, skin covers and/or skin creams may be recommended.

VI. NON-BEAM HAZARDS

Depending on the power source, composition, and other factors, a laser may pose additional hazards independent of the beam intensity. Among these additional hazards are electrical shock, fire, explosion, and exposure to radiation or hazardous chemicals. As a result, it is critical that the Principal Investigator, RSO, and Radiation/Laser Safety Committee account for these hazards when creating and approving a laser use protocol.

6.1 ELECTRICAL, FIRE, AND EXPLOSION HAZARDS

Some lasers require high-voltage power sources, large capacitors, and intricate wiring to generate the desired beam strength. These high-voltage sources—in combination with other laser components—present the risk of electrical shock, fire, or explosion. To minimize the likelihood of these events, practice the following:

1. Check the condition of electrical cords and outlets on a regular basis
2. Repair or replace compromised cords or outlets immediately
3. Properly ground high-voltage equipment and use GFCI outlets
4. Avoid overloading circuits (no daisy-chaining)
5. Ensure warning lights clearly signal when the device is powered
6. Use equipment only as designed (get approval before altering device)

6.2 CHEMICAL HAZARDS

Chemical hazards associated with laser use include laser dyes, compressed gases, cryogenic fluids, and toxic or noxious chemical byproducts. These hazards must be accounted for in the operating and training procedures for a given laser system. Where applicable, laser operators should have access to MSDS sheets for each chemical hazard.

6.3 RADIATION HAZARDS

Laser components and power supplies may discharge energy in the form of UV, visible, or ionizing (X-ray) radiation. Additionally, interactions between very high-powered lasers and target materials may produce process radiation in the form of plasma. The potential for these hazards must be thoroughly vetted by the PI, RSC, and RSO during the operating procedure approval process.

VII. Training and Program Oversight

7.1 Laser Safety Training

Lasers now contribute to many aspects of biomedical, chemical, physical, and engineering research. They serve as stand-alone devices and as critical components of complex instruments—confocal microscopes, flow cytometers, cell sorters, mass spectrometers, etc. Due to their increasingly ubiquitous presence in the laboratory setting, all researchers must have a general awareness of laser safety. Researchers at Dartmouth College are provided laser safety training in the following ways:

General Laser Awareness Training

Audience:	All Dartmouth-affiliated researchers
Medium:	Web-based training incorporated into "Laboratory Safety Training"
Key Topics:	Laser classification, signs/postings, bioeffects, laser pointers, etc.
Frequency:	One time

Laser Safety Training

Audience:	Dartmouth-affiliated researchers operating Class IIIb and IV lasers
Medium:	Web-based training
Key Topics:	Control measures, non-beam hazards, specular/diffuse reflections, user responsibilities, emergency protocols, etc.
Frequency:	Annual

Equipment-Specific Laser Use Training

Audience:	Dartmouth-affiliated researchers operating Class IIIb and IV lasers
Medium:	Documented hands-on training with PI/Laser Training Manager
Key Topics:	Fundamental operations, control area boundaries, safety features, interlocks, emergency protocols, etc.
Frequency:	Each time a new device is used or when changes are made

7.2 Laser Laboratory Inspections

Laboratories using or housing Class IIIb and Class IV lasers are to be inspected by the RSO on an annual basis. These inspections should be coordinated such that the PI or Laser Training Manager is present. Inspections are comprised of the following:

- Review of laser operator training log;
- Review of the laser inventory for the lab space;
- Review of laser use SOPs/research purpose;
- Evaluation of laser control areas, interlocks, PPE, safety equipment, etc.

7.3 Laser Inventory

All Class IIIb and Class IV lasers housed at Dartmouth College must be registered with the RSO, approved by the RSC, and accounted for in the master laser inventory. The inventory must include an individual entry for each laser, complete with location, classification, PI, LTM, and laser specifications.

VIII. Laser Incident and Emergency Procedures

8.1 Laser Incident Reporting Procedures

General Laser Incident Reporting Policy

All laser related incidents—irrespective of severity—must be reported to the PI and the Laser Training Manager by the laser operator. This includes near miss incidents, laser malfunctions, and abnormal operations. Each incident must be reviewed in a coordinated manner—by the PI/Laser Training Manager (LTM), RSO, and laser operator—to determine if changes should be made to the standard operating procedures or safety equipment for a given device.

Laser Incident Involving Known or Suspected Exposure

- Seek immediate medical care/eye exam for exposed individual (within 24 hours)
  - Minor injury during normal work hours – Occupational Medicine
  - Major injury or after hours exposure – DHMC Emergency Room
- Notify PI/LTM of incident as soon as possible
- PI/LTM must notify RSO of incident (within 24 hours)
- Complete an exposure report and activate RSO follow-up review procedures

8.2 Immediate and Follow-Up Procedures

Immediate Emergency Response Procedure

- If safe to do so, cut power to laser equipment
- Evaluate personnel and the work area to determine the extent of the accident
- Seek medical care for exposed individuals (call Safety and Security at 646-4000)
- Notify all lab personnel of the incident
- Prevent the laser from being re-energized
- Notify PI/LTM responsible for the equipment involved
- Contact EHS by calling 646-1762 or after-hours paging 442-1058

Laser Incident Follow-Up Procedure

- RSO, PI/LTM, and laser operator meet to discuss incident
- Incident report must include date and time of incident, laser user and equipment involved, extent of damage/injury, medical care administered, etc.
- RSC must review incident report to evaluate laser SOPs and safety equipment
- Alterations to the SOP/safety equipment must be delivered to the PI/LTM in the form of a letter from the RSC chair

8.3 Medical Surveillance

Dartmouth College does not require pre- or post-employment medical examination for laser operators. All laser-related injuries and exposures must be reported to the PI/LTM and the Radiation/Laser Safety Officer within 24 hours. In the event of a known or potential exposure, personnel must seek immediate medical attention.