



GUIDANCE NOTE OHSU G27 (JULY 2005) (technically amended Nov 2014)

GUIDANCE NOTES ON LASER SAFETY

INTRODUCTION

Work with lasers at the University is very diverse and is also in many cases at the forefront of research activities that are ever developing and changing. Lasers are used not only in analytical apparatus in the biological sciences but also in other advanced technologies such as opto-electronics and nanotechnology.

All lasers are potentially hazardous. The actual degree of the hazard is however related to the controls and use. This Guidance Note controls on the safe use of all lasers in order to prevent any harm occurring or any person from being exposed to risk.

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SECTION 1: POLICY

1. RESPONSIBILITIES

- i. The Vice-Chancellor, as Chief Executive Officer of the University, has overall responsibility for administration and implementation of the University's Health and Safety Policies, as determined by the University Council.
- ii. The Head of School/ Department is responsible for ensuring the safe use and operation of all lasers within his/her School or Department and for ensuring the laser is registered with Health and Safety Services as appropriate.
- iii. The University shall appoint a suitably qualified and / or experienced Laser Safety Officer (LSO) and he/she will be responsible for advising the University on all safety matters concerned with the use of lasers and for carrying out such duties as are required.
- iv. The Radiation Health and Safety Sub-Committee has been charged with reviewing and revising this document and with overseeing its implementation. The Sub-Committee shall consider and act upon reports received from Health and Safety Services, the LSO and individual Schools/Departments, where necessary.

SECTION 2: DUTIES AND GUIDANCE

1. SCHOOL/DEPARTMENT DUTIES

- i. The Head of each School/Department, that undertakes laser work, where required shall appoint a Laser Protection Supervisor (LPS).
- ii. All Laser Workers at the University are subject to and shall follow the procedures established by this Guidance Note, appropriate risk assessments and by Local Rules produced by the School/Department.
- iii. Any University Laser Worker undertaking laser work in any establishment other than the University must conform to the Local Rules in force at that establishment and must ensure that a suitable and sufficient risk assessment has been completed and subsequently approved by the appropriate School/Departmental LPS.
- iv. Any person, not being a member of staff or a student of the University, who wishes to undertake laser work on University premises must at all times conform to this Guidance Note and appropriate Local Rules. The appropriate LPS must approve all such work.
- v. Members of staff and students wishing to work with Class 3B / 4 lasers - with the exception of undergraduates participating only in supervised teaching/demonstration activities - must be registered as Laser Workers. The Register of Laser Workers is compiled by the LPS and it is the duty of the LPS to ensure that the LSO is provided with a copy of the School/Department Register and informed immediately of any additions to, or deletions from, the Register so that a central Register of all Laser Workers is kept. All Laser Workers will be required to sign a declaration that they have read the Local Rules. Registration must always be completed before work with lasers is commenced.
- vi. All Laser Workers must be made aware of their responsibilities both to themselves and to others i

accidental viewing and can potentially cause eye injuries, but the actual risk of injury following a short, accidental exposure, is still small.

Class 3B lasers may have an output power of up to 500 mW (half a watt). Class 3B lasers may have sufficient power to cause an eye injury, both from the direct beam and from reflections. The higher the output power of the device the greater the risk of injury. Class 3B lasers are therefore considered hazardous to the eye. However, the extent and severity of any

5. LASER PROTECTION SUPERVISOR (LPS)

- i. In Schools and Departments where Class 3B / 4 lasers are used the Head of School/Department, in consultation with the LSO, should appoint a suitably qualified and/or experienced member of staff as LPS. The LPS will be responsible for assisting the Head of School/Department in ensuring that all appropriate lasers used in the School/Department are registered and used in compliance with this Guidance Note and good practice and that suitable and sufficient risk assessments are undertaken.
- ii. The LPS has a duty, to the Head of School/Department, to supervise the general day-to-day control of use of lasers, the laser safety standards within the School/Department. The LPS shall also undertake to monitor and advise upon the School compliance with this University Guidance Note, appropriate Local Rules on the Safe Use of lasers and other appropriate control measures. To achieve these requirements the LPS should ensure that:

All Class 3B / 4 lasers are Registered by the School/Department with the LSO.

All lasers are labelled in accordance with Appendix 6.

Safe Systems of Work are drawn up, where necessary, for the safe operation of lasers and all Risk Assessments are completed and suitable.

Personnel intending to work with Class 3B / 4 lasers or who may be working with modified Class 1M or Class 2M devices are registered with the LSO as Laser8(dev)10(i)-4(ces)4(ar)

low-power alignment lasers) and therefore such lasers should never be directed, whether

Temporary visual affects may produce disturbing after-images and induce reactions such as watering eyes and a headache; persistent rubbing of the eyes in response to a perceived injury can also result in painful corneal abrasions.

There are other hazards associated with laser use that can cause harm

The establishment of a MPE should be made in cooperation with the LSO or the LPS using calculations and examples provided by BSi PD IEC TR 60825-14:2004. The MPE must be established for all Class 3B / 4 lasers as part of the Risk Assessment process.

11. GENERAL INFORMATION

i) General Controls

Where an initial risk assessment has shown that an unacceptable level of risk does exist then

In some cases temporary Laser Controlled Areas should be established. Servicing of lasers by an outside company should be considered as part of the general laser risk assessment.

iii) Accident and Incident Report and Investigation

In the event of an actual or potential hazardous exposure to a laser or the failure or possible failure of a control feature an Accident/Incident Report must be completed and an investigation must be undertaken. All work on that laser apparatus should stop until such time as the accident/incident is explained and control measures reviewed. All accidents should be reported to Health and Safety Services immediately and all

<i>for office use</i>

REGISTRATION OF LASER WORKERS (Class 3B / 4)

Note: The Laser Protection Supervisor (LPS) is responsible for returning this Form to the Laser Safety Officer (LSO), so that the worker can be added to the Register, **before** work with lasers

for office use

LASER WORKERS: CESSATION OF LASER WORK

School/Department	
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The following laser worker(s) will be ceasing laser work (or leaving the University) on the date shown and should be removed from the Register of Laser Workers.

Name	Date
[REDACTED]	
[REDACTED]	

Laser Designated Areas		YES	NO
17	Is a written system of work available for access, egress and use of equipment?		
18	Is access restricted to authorised personnel only?		
19	Is the area free from unnecessary equipment & reflecting surfaces?		
20	If more than one laser is used at once are suitable opaque screens used for separation?		
21	Are there remote interlocks for doors?		
22	Is there adequate ventilation to prevent build-up of toxic vapours?		

Class 3B / 4 Lasers		YES	NO
23	Is the beam path enclosed?		
24	Are suitable Laser Safety Goggles provided if beam is not totally enclosed?		
25	Are special Alignment Goggles provided?		
26	Is necessary protective clothing provided for use with Class 4 lasers?		
27	Key control switches?		
28	Automatic beam shutters or attenuators?		
29	Audible or visible warning device indicating that laser is in use?		

Emergency Planning		YES	NO
30	Have all potential laser hazards been assessed?		
31	Are contingency plans in existence for emergencies?		

Action Required	

Auditor Signature		Witnessed By	
Position		Position	

Guidance for Questions	
1	Laser Workers observed in laboratories can be checked against the Laser Worker Register, or copies circulated to relevant Laboratory Heads/Project Supervisors. The University LSO should be informed <u>immediately</u> of any unregistered workers.
2	Assessment of individual competency based on working practices/observed conditions in labs.
3	List to be held by the School/Departm.

In addition each access panel or protective housing shall bear the words:

**CAUTION - CLASS LASER
RADIATION WHEN OPEN**

With the appropriate class inserted and then followed by the hazard warning associated with that Class of laser (see warning statements in following labels). *For the area signs the specific 2t Gf(4)11(ns)40he 5(n)11peci t*

Class 3R

Label with hazard warning symbol. Explanatory label bearing the words: -1400nm ONLY) bearing the words:



Note:

Class 3B

Label with hazard warning symbol. Explanatory label bearing the words:



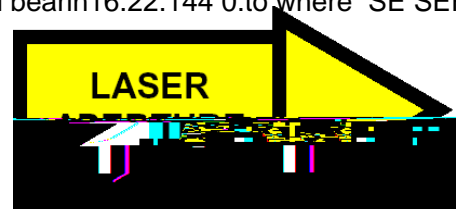
Class 4

Label with hazard warning symbol. Explanatory label bearing the words:



Aperture Labels for Class 3R, Class 3B & Class 4 Lasers

Each Class 3R, Class 3B and Class 4 laser product shall display a label close to where the beam is emitted bearing the words 'LASER APERTURE' or 'AVOID EXPOSURE - LASER RADIATION IS EMITTED FROM THIS APERTURE'.



2. At Los Alamos National Laboratory, California USA, 2004

On 14th July 2004 an undergraduate student was injured whilst working with a Nd:YAG laser in the Chemistry Division. The work involved the use of two lasers one to analyse particles (L1) and one to generate and suspend particles in a target chamber (L2). On the day in question the Principle Investigator (PI) was using L1 in flash-lamp mode to illuminate the suspended particles. After firing and shutting down L2 the PI removed the beam stop from behind the target chamber and looked inside whilst L1's flash lamps continued to operate.

When the student bent down to look too she immediately saw a flash and a reddish-brown spot in her left eye - a hole had been burnt in her retina.