

# UCL AOR Safety Standard

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## 1 Introduction

Sources of Artificial Optical Radiation (AOR) are those which are artificially created by human activity and can be divided further into two broad categories: lasers (coherent) and broadband optical sources (non-coherent).

UCL must comply with the specific requirements of the Control of Artificial Optical Radiation at Work Regulations 2010 (AOR10). Under AOR10, employers are required to assess the risks posed to staff and others by exposure to AOR. AOR10 applies to both lasers and broadband optical sources and utilises a set of Exposure Limit Values (ELVs). Exposures to staff and others below these ELVs will not cause harm.

This standard applies to staff, visiting academics and others who may be affected by UCL's use of AOR. This document is supported by guidance, which includes information on the sources of AOR that must be managed at UCL. Additional information and guidance on the safe use of lasers is available from the [Association of University Radiation Protection Officers](#).

## 2 Responsibilities

The roles and responsibilities for the management of risks associated with AOR are summarised below.

### Heads of Department

The HoDs are responsible for:

- Ensuring that the requirements of this standard are implemented and managed within their Departments.
- Appointing and notifying one or more suitable persons to act as Laser Safety Officers (LSOs).

### UCL Laser Protection Officer (LPO)

The LPO is responsible for:

- Ensuring the continuing safe use of AOR equipment.
- Monitoring compliance with this standard and local procedures for ensuring safe AOR use.
- Creation and maintenance of a list of identified AOR equipment.
- Acting as a point of contact for seeking appropriate advice from a certified external LPA.
- Ensuring regular liaison is maintained between the DSOs, LSOs and the LPO; including arranging periodic LSO forums.
- Address any non-compliances raised by the LSOs etc. and escalate significant issues to the UCL Health & Safety Committee.
- Liaise with enforcing authorities.

## **Laser Safety Officers (LSO)**

The Laser Safety Officer (LSO) for an area will supervise the day-to-day use of identified AOR equipment and will ensure that:

- The LPO is consulted on all matters of AOR radiation safety, including notification of any acquisitions, changes in work practices, and facilities or equipment.
- Maintain an up-to-date inventory of all AOR equipment held locally, and report any new acquisitions or disposals to the LPO.
- All AOR equipment is operated in accordance with this standard and associated guidance.
- Risk assessments and AOR schemes of work are produced and reviewed periodically, or when there is a significant change.
- Staff whose work could potentially expose them to harmful levels of AOR receive appropriate training and that records of this training are created and maintained.
- Any necessary personal protective eyewear or equipment required for the safe use of identified AOR sources is provided, worn, and maintained as appropriate.
- All users of AOR equipment have read and understood the AOR scheme of work (applicable to the use of the equipment) and have signed as having read and understood them.
- All users are entered in the Departmental Responsible Persons Register as AOR Approved Users and the register is kept up to date.
- AOR equipment is only operated by an Approved User in an appropriately prepared facility that has been inspected by the LPO.
- AOR equipment is subject to regular maintenance.
- The facilities where the equipment is used are maintained in good repair with all safety features, controls and warning signs fully operational.
- Any defects with the equipment, facilities or safety features are reported to the LPO; work should be suspended immediately and not re-started until appropriate repairs have been completed, and approved by the LPO.
- Appropriate contingency plans are in place for all reasonably foreseeable incidents.

## **External Laser Protection Adviser**

The Laser Protection Adviser (LPA) is a suitably experienced and qualified individual who will support the LPO and appointed LSOs when required; this will include providing safety advice either through correspondence or by attending the University. The LPA may also be requested by the LPO/Head of Safety to carry out audits of AOR facilities.

## **Principal Investigators**

Acting on behalf of the Deans, Principal Investigators have the responsibility for ensuring any AOR equipment is fit for purpose and safe to use. This includes supporting the Laser Safety Officer and

ensuring their duties have been met. Where issues are raised of non-compliance, the Investigators will work with key individuals, the LSO and LPO, to address these shortfalls.

### **Laboratory Managers**

Similarly to DSOs, Laboratory Managers are required to support the appointed LSOs in implementing and managing AOR safety considerations in their areas of control.

### **Users**

Approved AOR users must:

- Read, sign and comply with the requirements of the AOR schemes of work.
- Complete the 'Safe Use of Laser Devices' training course, and receive a local laser safety brief from the LSO before commencing work.
- Only use AOR equipment in facilities designed for the use of that equipment.
- Read and understand the risk assessment for the work.
- Wear any PPE specified in the risk assessment at all times.
- Report any identified defects in the equipment, facilities or personal protective equipment to the appointed LSO immediately.

## **3 Risk assessments for AOR sources**

Risk assessments must be completed at a local level by those individuals working with the AOR sources, or by those with responsibility for the supervision of the work. The risk assessment must consider:

- Level, wavelength and duration of exposure.
- The Exposure Limit Values (ELVs).
- The effects of exposure on employees or groups of employees whose health is at particular risk from exposure.
- Any possible effects on the health and safety of employees resulting from interactions between AOR and photosensitising chemicals.
- Any indirect effects of exposure such as temporary blinding, explosion or fire.
- Both beam and non-beam hazards (e.g electrical, chemical, fume).
- The availability of equipment designed to reduce levels of exposure.

The risk assessment should be formally recorded. A specialist laser risk assessment template on RiskNET must be used for recording the assessment. The LPO will be responsible for approving the assessment.

## 4 Implementation of control measures

When implementing control measures, following the outcome of the risk assessment, the hierarchy of control measures **must** be used to minimise the risk of exposure. If an administrative control is given preference over an engineering control, then the case must be made clearly as to why an engineering approach has not been adopted.

For any work where the risks cannot be eliminated or minimised to negligible levels, the risk assessment should contain a justification as to why the work is being carried out in such a way. It is the responsibility of the researcher or member of staff who wishes to carry out laser work to produce this justification within the assessment. An LSO should determine whether the exposure risks have been adequately controlled. Should the LSO have any concerns with the risk assessment or control measures he/she will refer the assessment to the LPO.

## 5 New or modified facilities

For any new facilities at the University where Class 3B or 4 lasers are to be used, advice must be sought from the LPO at the planning/design stage. This includes any existing facilities which have been modified in such a way as to affect the existing engineering and administrative control measures. The LPO will assess the new or modified facility against the requirements of the relevant legislation, standards and guidance and recommend improvements where necessary. These improvements must be addressed before work with lasers begins or recommences.

## 6 Schemes of work

Schemes of work are written procedures based on the outcome of the risk assessment, and should state how the risks to staff and students from hazardous AOR sources will be managed. They should be relevant to the area where the AOR source is used. The LPO will approve the schemes of work once they have been produced by the researcher or member of staff.

## 7 AOR safety training

### **Users, Laboratory Managers, and Principal Investigators**

Users and those who are responsible for areas where hazardous AOR is used shall have attended and successfully completed the AOR safety training course. This will cover:

- The hazards posed by the sources of AOR in the workplace, including biological effects and non-beam hazards.
- An introduction to the legislative requirements and how the University manages AOR safety.
- Content of risk assessments and the implementation of control measures.
- Dealing with incidents involving AOR sources.

## Laser Safety Officers

LSOs must successfully complete the laser safety training course run by Safety Services. This will cover:

- The hazards posed by the sources of AOR in their workplace, including biological effects and non-beam hazards.
- Assessment of hazards posed by beams including the determination of key safety parameters such as the Exposure Limit Values, Nominal Ocular Hazard Distance and Hazard Distance.
- The legislative requirements of AOR10.
- The requirements of the safety standards for lasers and AOR sources.
- Guidance on the safe use of lasers by AURPO.
- How the University manages AOR safety.
- The production of risk assessments and the implementation of control measures.
- Carrying out monitoring of AOR safety.
- The role of the Laser Safety Officer.
- Dealing with incidents involving AOR sources.

Records of training must be maintained by the LSO. AOR safety training should be refreshed at routine intervals (approximately every 3 years) or when there have been major changes to legislation or the University's AOR safety framework.

## 8 Assurance

The University is required to monitor its AOR safety arrangements to:

- Check whether this standard is being implemented,
- Procedures are appropriate and effectively applied,
- Non-compliances are promptly identified, and addressed in a timely manner.

The outcome of AOR safety monitoring will be discussed during the AOR Forum and the Chair will raise any matters of concern to a higher level.

The following assurance regime will be applied.

- LSO: Annual basis. Formal review of how AOR safety is being managed within their area of responsibility, to include the content of procedures being applied (risk assessments, scheme of work, specific additional experiment or equipment safety instructions).
- LPO: Annual basis. In addition to selected assessments of specific uses and applications as carried out by the LSO (see above), formal independent review of the management and implementation of AOR safety.

## 9 Dealing with incidents

All incidents are to be reported using RiskNET. The scheme of work for each area must detail the steps that should be taken in the event of a foreseeable incident involving hazardous sources of AOR. The LSOs should be notified of any incidents and they will investigate the causes and report to the LPO.

In the case of a known or suspected eye strike from a laser beam (either direct, reflected or scattered with the ability to cause injury – Class 3B and 4), the affected individual must be assessed by a trained ophthalmologist within 24 hours.

Safety Services Reference(s):

UCL AOR Standard	
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