University Health & Safety Arrangements : Chapter 26

Non-ionising radiation safety

Note

"Senior Managers" are responsible for health and safety within their organisational unit, specified areas or as a consequence of their activities, and for any additional activities as agreed and delegated to them (e.g. where they accept responsibility for day-to-day safety arrangements for staff who have other line managers, for reasons of geographical or other convenience). They may be Deans, Heads of School, Directors of Institutes, Directors and Heads of Service in non-academic areas, the University Librarian, the Directors of the Manchester Museum and the Whitworth Art Gallery, and their equivalents.

Introduction

1. The University uses a large number and range of non-ionising radiation sources in its teaching and research. Health and safety arrangements are generally made and enforced locally, with the central Radiation Safety Unit providing oversight, policy direction, technical and legal expertise, and guidance.

2. This Chapter describes the framework for managing activities using non-ionising radiation sources within the University, and outlines the responsibilities of different personnel who approve, manage and supervise work involving them.

3. Artificial Optical Radiation (AOR) is defined as 'non-naturally emitted electromagnetic radiation with wavelengths between 100nm to 1mm.' Exposures can result in damage to eyes and skin, such as burns or reddening of the skin (erythema) or surface of the eye (photokeratitis), burns to the retina of the eye and damage to the lens of the eye that can cause early onset of cataract. The legislation covering the use of AOR are the Control of Artificial Optical Radiation at Work Regulations 2010 (CAOR).

4. Harmful non-ionising radiation sources fall into the following categories:
   - Artificial optical radiation that includes equipment such as UV lamps, transilluminators, infra-red lamps/hot work (including welding), microwaves and lasers.
   - Electromagnetic fields that includes equipment such as transformers (in the high voltage labs), medical scanners, and various high field magnets.

5. Electromagnetic fields (EMFs) are produced whenever a piece of electrical or electronic equipment is used. They can be static electric, static magnetic and time varying electric, magnetic and electromagnetic (radio wave) fields with frequencies up to 300 GHz. The effect of exposure to high levels of EMFs can be irritating or unpleasant such as nausea, vertigo, flickering sensations, metallic taste in the mouth, and can be extremely serious for colleagues who have certain medical implants. The legislation covering the use of this type of equipment are the Control of Electromagnetic Fields at Work Regulations 2016 (CEMF)

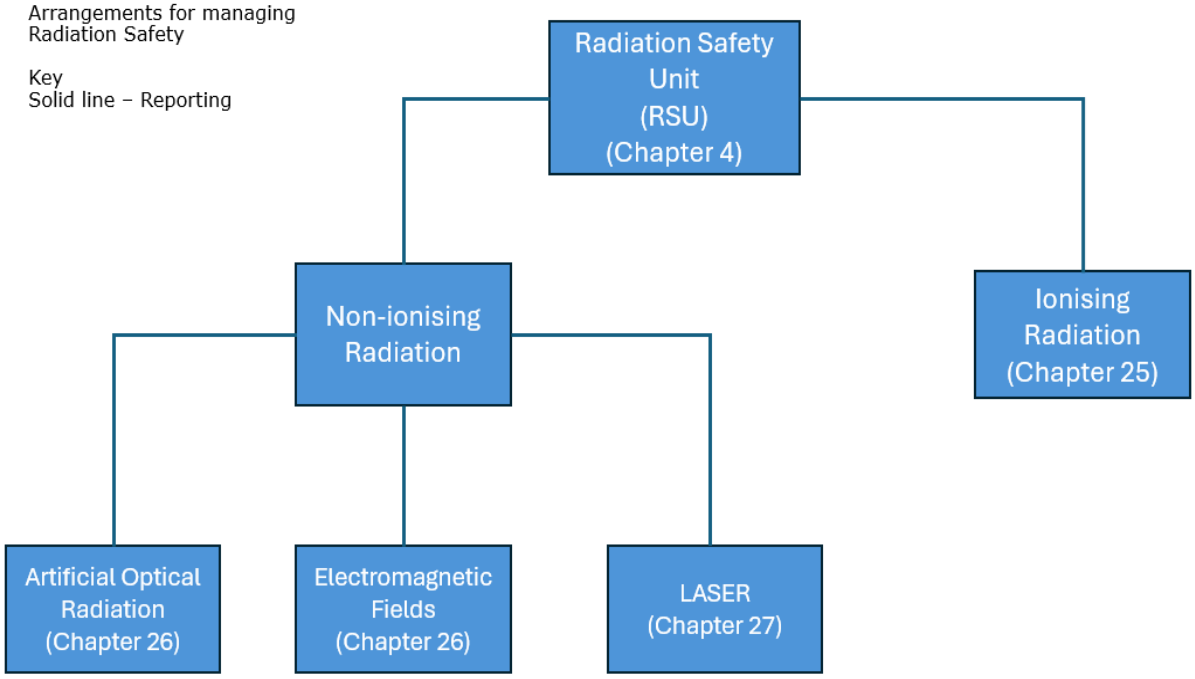
6. Arrangements for work with Laser radiation (Light Amplification by Simulated Emission of Radiation) is considered in Chapter 27, so will not be discussed here.

Arrangements for Managing Radiation Safety

Figure 1

Arrangements for managing Radiation Safety

Key
Solid line – Reporting



7. The responsibilities of the Radiation Safety Unit are outlined in Arrangements, Chapter 4.

8. To support non-ionising radiation work, the University has constituted a Non-Ionising Radiation Safety Working Group.

9. The Working Group is not a formal advisory group. It is a forum for University Colleagues, including subject matter experts working with Non-ionising Radiation to exchange knowledge, consider scientific developments, devise guidance where appropriate or necessary, and to make recommendations on good practice through the Radiation Safety Advisory Group (RSAG).

Non-Ionising Radiation Working Group (NIRWG)

Membership

Chair: Suitably experienced Academic colleague
Deputy Chair: Suitably experienced Academic colleague
Secretary: University Non-Ionising Radiation Technical Adviser

Local Non-Ionising Radiation Safety Advisors
Trades Union Representatives for the University

In attendance:

Representative(s) from Safety Services
Head of the Radiation Safety Unit
School Safety Advisers

10. The Working Group will;

- advise the Radiation Safety Advisory Group (RSAG) on all matters relating to non-ionising radiation safety associated with research and teaching via the submission of minutes and reports from the Chair;
- submit to the Radiation Safety Advisory Group for its approval, codes and action plans to ensure the University fulfils its obligation to staff, students and others with respect to all aspects of non-ionising radiation;
- monitor compliance with legislation, non-ionising radiation safety codes, to assist managers to ensure their areas work in compliance with relevant statutory obligations;
- take such action as is necessary to improve compliance and / or performance.
- advise on training requirements for managers, advisers, Technical Specialists and users;
- advise on technical matters such as radiation metrology and monitoring equipment;
- promote cooperation and communication between the University, its staff and students in all matters relating to non-ionising radiation.

Responsibilities of the Head of School / Department / Institute

11. In addition to the general roles and responsibilities specified in the Safety Policy the Head of School must ensure that;

- where required, a School / Departmental or Institute must appoint such Non-Ionising Radiation Safety Adviser as are necessary and make these appointments in writing;
- appointed Non-Ionising Radiation Safety Advisers are given the authority and time to discharge the full duties of the role;
- must in cooperation with PIs ensure sufficient Technical Specialist are appointed to assist the Non-Ionising Radiation Safety Advisers;
- written local arrangements are made for non-ionising radiation safety management within their area;
- the arrangements describe the key contacts, their duties, the submission / approval process for risk assessments, standard operation procedure (sops) / written local arrangements, procedures for accident and incident investigations etc;
- a programme of approximately annual inspections of non-ionising radiation work is implemented;

- work with non-ionising radiation is adequately supervised and undertaken in accordance with written local arrangements / SOPs;
- all non-ionising radiation workers are adequately trained and instructed in working safely with non-ionising radiation sources;
- no new or modified work activity involving non-ionising radiation commences unless a suitable and sufficient assessment of the risk to employees or other persons has been performed, and that any remedial actions required by this assessment have been carried out;
- where work with non-ionising radiation sources is carried out in premises where responsibilities are shared between the university and one or more other employers, (e.g. in hospital trusts), the arrangements are in accordance with Chapter 18 and Chapter 20.

Responsibilities of the Principal Investigator

12. The Principal Investigator must;

- seek advice from their Non-ionising Radiation Safety Adviser, Local Safety Adviser, Technical Specialists or RSU before the commencement of any work that they intend to carry out with sources of non-ionising radiation;
- ensure users (including undergraduate and postgraduate students) are closely supervised until such time as they are suitably trained and competent to work with sources of non-ionising radiation and that a record of their training and competency assessment is kept.
- ensure that high risk sources (for example, Risk Group 3 lamps or lamp systems that could include Light Emitting Diodes – LEDs - as defined in British Standard BS EN 62741:2008) are inspected on an approximately annual basis, and the inspection reports are submitted to the relevant local safety adviser, who must in turn present or summarise these to the local health, safety and wellbeing committee.
- ensure Hazardous Sources of EMF are registered with the RSU and are inspected on an approximately annual basis, and the inspection reports are submitted to summarised for local HSW committees and the NIRSWG Teams Site.
- register with RSU the acquisition of any new:
  - Sources that emit radiation at wavelength ≤ 400 nm
  - Risk group 3 Artificial Optical Radiation sources
- - EMF emitting device which exceeds exposure limit values defined in the Control of Electromagnetic Forces Regulations.

Responsibilities of the Local Safety Advisor / Non-ionising Radiation Safety Advisor

13. The Local Safety Adviser / Non-ionising Radiation Safety Adviser must;

- recognise that responsibility for compliance with CAOR and CEMF lies with the Head of School / Department / Institute and cannot be delegated;

- understand the requirements of the relevant statutory instruments (legislation) in so far as they affect work within the School / Department / Institute;
- work with PIs, Technical Specialists and other laser employees as appropriate;
- understand the precautions and controls required to control exposures to harmful levels of non-ionising radiation;
- advise Heads of Schools / Departments / Institutes that all work with sources of non-ionising radiation within their area of responsibility is undertaken in accordance with current legislation and best practice;
- maintain an inventory of non-ionising radiation sources within their area and check that sources remain at their specified locations and under appropriate management control;
- assist managers to prepare suitable and sufficient risk assessments and thereafter ensure they are kept up to date, being reviewed on significant change (or after a period of three years at the latest);
- check that Risk Group 3 sources are inspected on an annual basis;
- provide advice to staff, students and Technical Specialists, managers regarding non-ionising radiation protection matters;
- check that users of Risk Group 3 AOR have undertaken suitable training and keep records of that training;
- inform the Head of School / Department / Institute of any non-ionising radiation protection concern that cannot be resolved locally, on a time scale commensurate with the risk, to the Head of School / Department / Institute;
- liaise with RSU regarding non-ionising radiation safety matters;
- attend meetings of the relevant committees when required, and in particular the Non-Ionising Radiation Safety Technical Working Group;
- ensure that accidents/incidents involving non-ionising radiation are investigated and reported on the University accident reporting system, and also to the local health and safety committee;
- disseminate non-ionising radiation protection information and reports, as appropriate, to staff and students;
- assist managers to create effective local arrangements and written instructions for their area and to ensure they remain up to date;
- ensure risk assessments have been created in conjunction with Non-ionising Radiation Safety Advisers and Technical Specialists, and are reviewed following any significant change or (at least) every three years;
- ensure that new members of the School / Department / Institute receive sufficient information, instruction and training with respect to non-ionising radiation protection matters and safety management arrangements to ensure they work safely and in compliance with local arrangements;
- identify staff or students in their area who would require radiation protection training or occupational health surveillance;
- co-ordinate the dissemination and implementation of advice from the Non-Ionising Radiation Technical Adviser.

Responsibilities of the Radiation Safety Unit Non-Ionising Radiation Technical Adviser

14. The responsibilities of the Non-ionising Radiation Technical Adviser are, in association with Technical Specialists and Local Safety Advisers;

- to maintain an electronic database of the location, nature, status and applications of all sources of non-ionising radiation on all sites belonging to the University;
- advise on a response to any event, accident or incident involving non-ionising radiation;
- assist with the assessment of exposure and doses, source emission characteristics and on the use of appropriate personal protective equipment (PPE);
- provide support with the preparation of local risk assessments;
- liaise with Safety Advisers and Technical Specialist to ensure that work with non-ionising radiation in undertaken safely;
- prepare and maintain an electronic database of all university employees whose activities involve the use of non-ionising radiation sources;
- prepare, maintain and distribute guidelines for the safe use of sources of non-ionising radiation, in accordance with current legislation and guidance from the HSE and specialist advisory bodies;
- to work with the NIRSWG and University specialist providers to prepare, review and deliver or make available such non-ionising radiation safety training and awareness courses to university staff and students;
- to advise Local Safety Advisors on legislative requirements and best practice with respect to non-ionising radiation sources, as appropriate to the work in their areas;
- to arrange and undertake surveys (both on a regular basis and when specifically requested) of laboratory areas and other university facilities where sources of non-ionising radiation are located, or any proposed locations;
- to prepare and maintain written and electronic records of all laboratory and equipment surveys undertaken as described above;
- to advise and assist with enquiries raised by laboratory users, technical and maintenance staff, and external contractors regarding non-ionising radiation;
- as appropriate, to attend and / or make reports to meetings of the university radiation safety advisory group;
- provide administrative support for the non-ionising radiation safety working group.

Installations and Service Engineer Visits

15. If an outside agency (e.g. the laser equipment supplier) is engaged to install or service any equipment, then a permit-to-work procedure must be issued, and then be followed (the person issuing the permit-to work must do this) for handing the equipment over to the service engineer and accepting it back, fully restored to normal operation, when the work is completed.

16. The PI, Local LSA, Technical Specialist or a suitable trained University employee must liaise with the external agency to ensure a suitable and sufficient risk

assessment is in place for activities undertaken by the outside agency. The assessment should include evaluation of the hazards posed to University personnel and assess PPE requirements for University personnel present during open beam work.

Support and Guidance

17. The Radiation Safety Unit is a source of further support and guidance and can be contacted through www.staffnet.manchester.ac.uk/rsu/.

Acronym / term	Meaning / definition
AOR	Artificial optical radiation, which includes equipment such as UV lamps, transilluminators, infra-red lamps / hot work (including welding), microwaves and lasers.
Canvas	The University digital teaching platform introduced in 2025.
CAOR	The Control of Artificial Optical Radiation at Work Regulations 2010.
CE (mark)	The CE mark is a mandatory European symbol indicating a product meets EU health, safety, and environmental standards, allowing free movement in the European Economic Area (EEA). Affixing it signifies the manufacturer's declaration of compliance with relevant directives (like for toys, electronics, medical devices) for products sold in the EU and EEA, including items imported from other countries. It's not a quality mark, but a declaration of conformity to essential requirements.
CEMF	Control of Electromagnetic Fields at Work Regulations 2016.
EMF	Electromagnetic fields are 'non-naturally emitted electromagnetic radiation with wavelengths between 100nm to 1mm', which includes equipment such as transformers (in the high voltage labs), medical scanners, and various high field magnets.
HSE	Health and Safety Executive.
HSW	Health safety and wellbeing.
LED	Light emitting diode.
LSA (or LLSA)	Laser Safety Adviser (Local LSA), the LSA is an advisory role who provide advice on laser technologies, compliance and safety to the Heads of Schools and Departments, and also to employees, visitors and students.
NIRSWG	Non-ionising Radiation Safety Working Group.
PPE	Personal protective equipment.
Risk Group 1	Trivial sources - Risk Group 1 lamp or lamp system (including LEDs) as defined in the British Standard BS EN 62471:2008
Risk Group 2	Not hazardous in normal use – Risk Group 2 lamp or lamp system (including LEDs) as defined in the British Standard BS EN 62471:2008

Risk Group 3	Hazardous - Risk Group 3 lamp or lamp system (including LEDs) as defined in the British Standard BS EN 62471:2008
RSAG	Radiation Safety Advisory Group
RSU	Radiation Safety Unit.
UKCA (mark)	The UKCA (UK Conformity Assessed) mark is a British product marking indicating compliance with UK regulations for goods sold in Great Britain (England, Scotland, Wales) after Brexit, replacing the CE mark for many products, covering safety, health, and environmental standards for items like toys, machinery, and electronics. While mandatory for new goods in GB from January 2021, the CE mark remains valid for an extended period, creating a transitional phase where both might be accepted, but the UKCA mark signifies adherence to UK-specific rules.
ULSO	University Laser Safety Officer.
SOP	An SOP (Standard Operating Procedure) is a set of step-by-step instructions detailing how to perform routine tasks to ensure efficiency, quality, consistency, and compliance with regulations, acting as a guide for employees on the 'what, when, and how' of specific operations, reducing errors, and aiding training.
Written local arrangements	Written working procedures may accompany or supplement SOPs.

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