THE UNIVERSITY *of* EDINBURGH

Briefing on Electromagnetic Field (EMF) radiation and its relation to the University Research and other areas

School Safety Advisers Conference – 30th May 2024

Mark Green

University Radiation Protection Adviser

University Radioactive Waste Adviser

Dangerous Goods Safety Adviser

Non-ionising Radiation Safety Update

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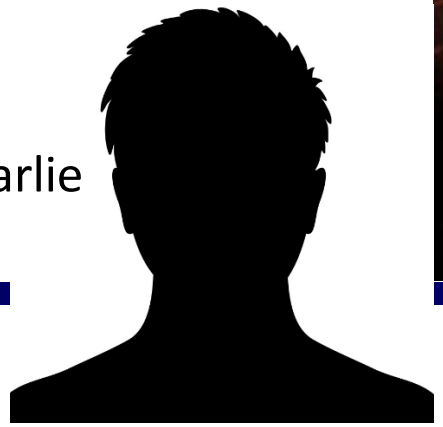
Outline of update

- Asked for 5 minutes, got 20…
- Introduce the RP Unit team
- What do we mean by *Ionising radiation* and *non-ionising radiation*
- Laser Safety
  - Why the big push to change?
  - HSE examples of poor practice (pictures)
  - What's new
- Electromagnetic Field (EMF) Safety
  - New Training Course
  - How does EMF affect us?
  - What do I need to do?

RPU Team

- Mark Green
  - University Radiation Protection Adviser
- Duncan Ross
  - Assistant (Trainee) Radiation Protection Adviser
- Scott McLaughlin
  - Health & Safety Technical Assistant

Starring Phil Rodgers as Charlie Townsend…

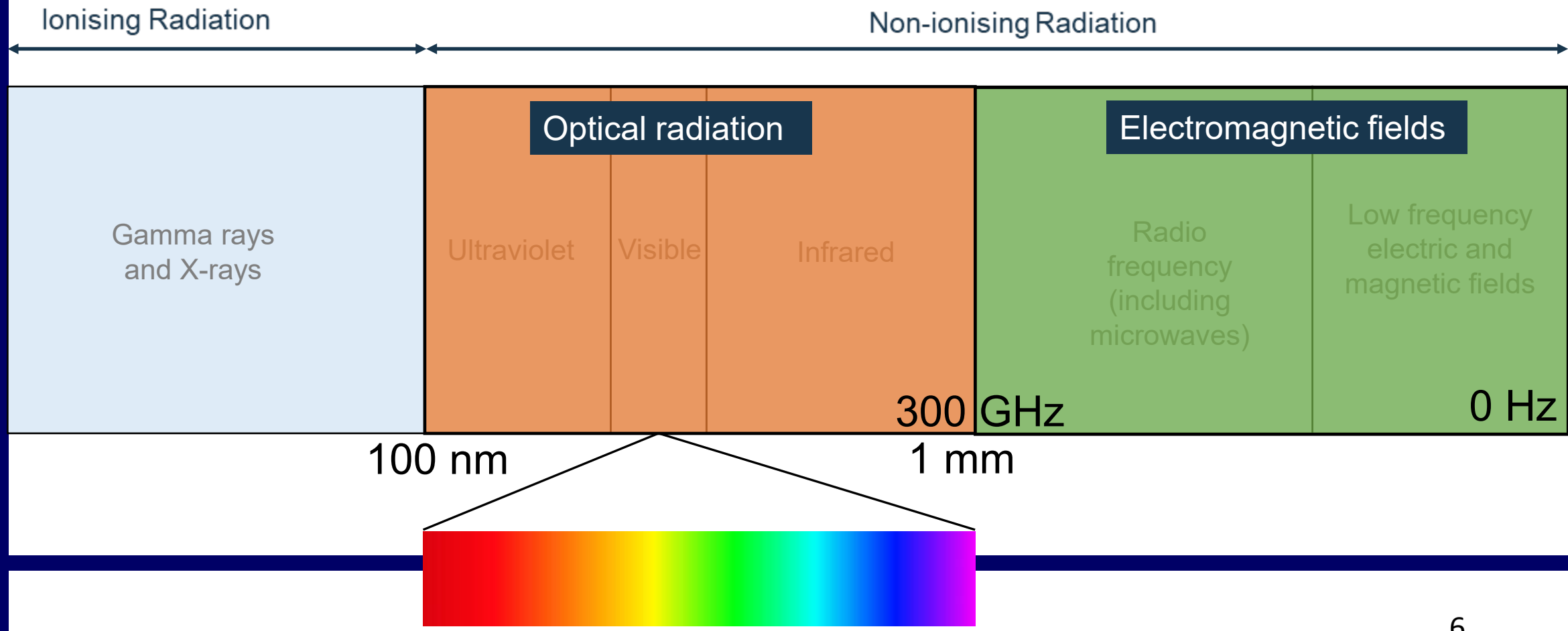


Ionising and Non-Ionising Radiation

- show of hands…

Ionising and Non-Ionising Radiation

- The Electromagnetic Spectrum



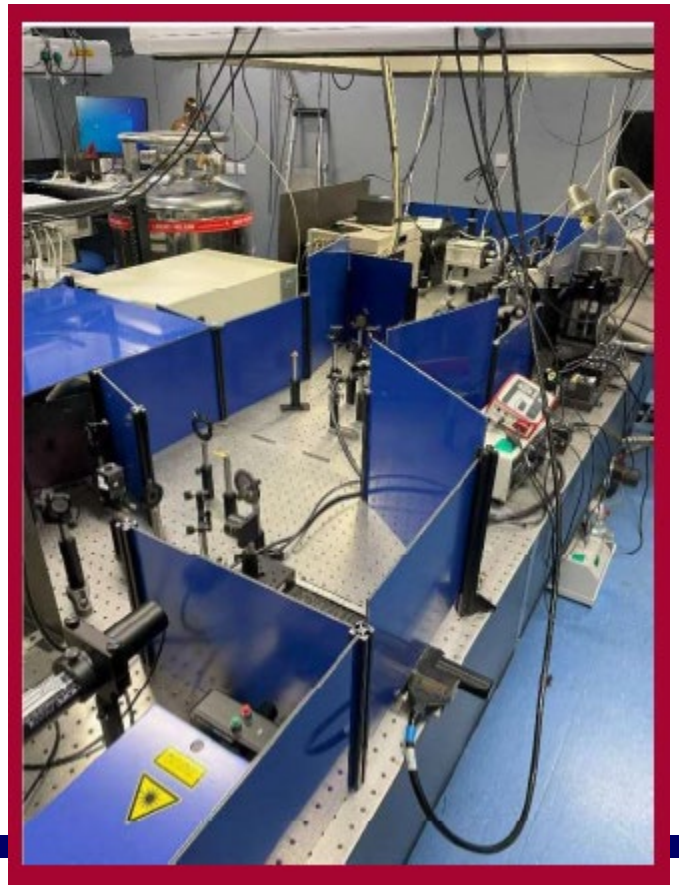
Laser Safety – why we needed to change

- Ongoing University Laser Inspections by HSE
  - AURPO 2018 / Loughborough 2021/2022/2023
- University's not performing well…>80% MB rate
- Recurring common themes…
  - Poor Risk Assessments – lacking in detail
  - Placing reliance on PPE worn by those in the room
  - Not following hierarchy of controls
    - Engineering Controls > Procedural > PPE
  - Too much open beam work
    - Poor or no justification on why
    - Laser alignment not considered well

- No enforcement/advice
- Verbal advice
- Written advice - Notification of Contravention (MB + FFI)
- Improvement Notice (MB + FFI)
- Prohibition Notice (MB + FFI)
- Prosecution

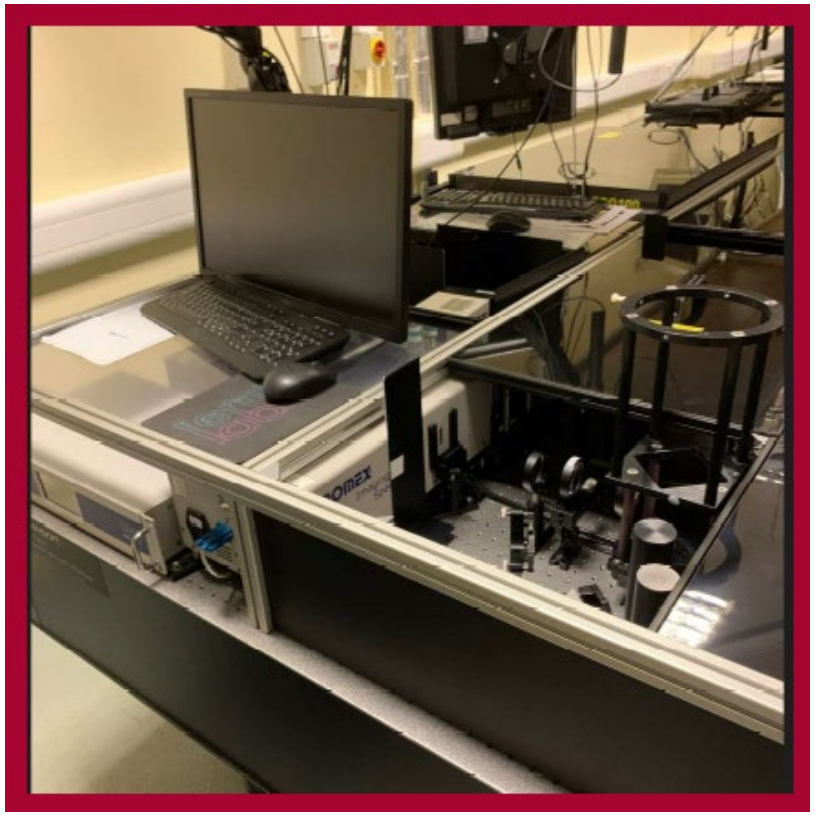
Laser Safety – why we needed to change

- HSE example photos of poor practice…



Too open; no lids

Workstation next to laser



Laptop/PC/screen on optical table looking at the set-up / alignment

Laser Safety – why we needed to change

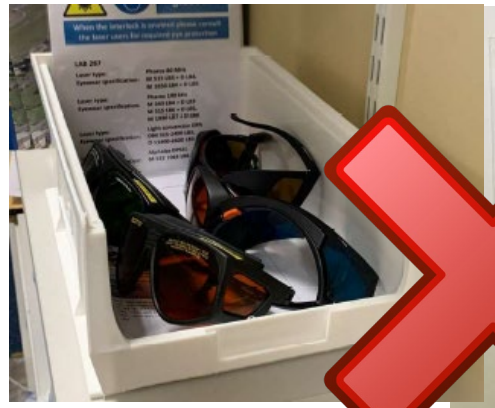
- HSE example photos of poor practice…

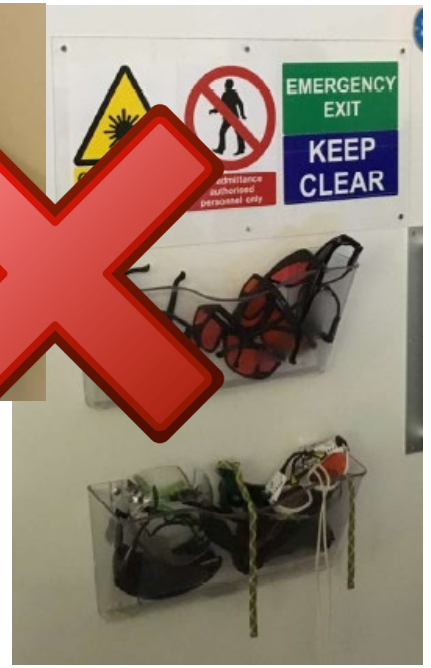
Poor storage / condition of PPE especially laser safety eyewear

Laser Safety – why we needed to change

- HSE example photos of ~~poor~~ good practice…

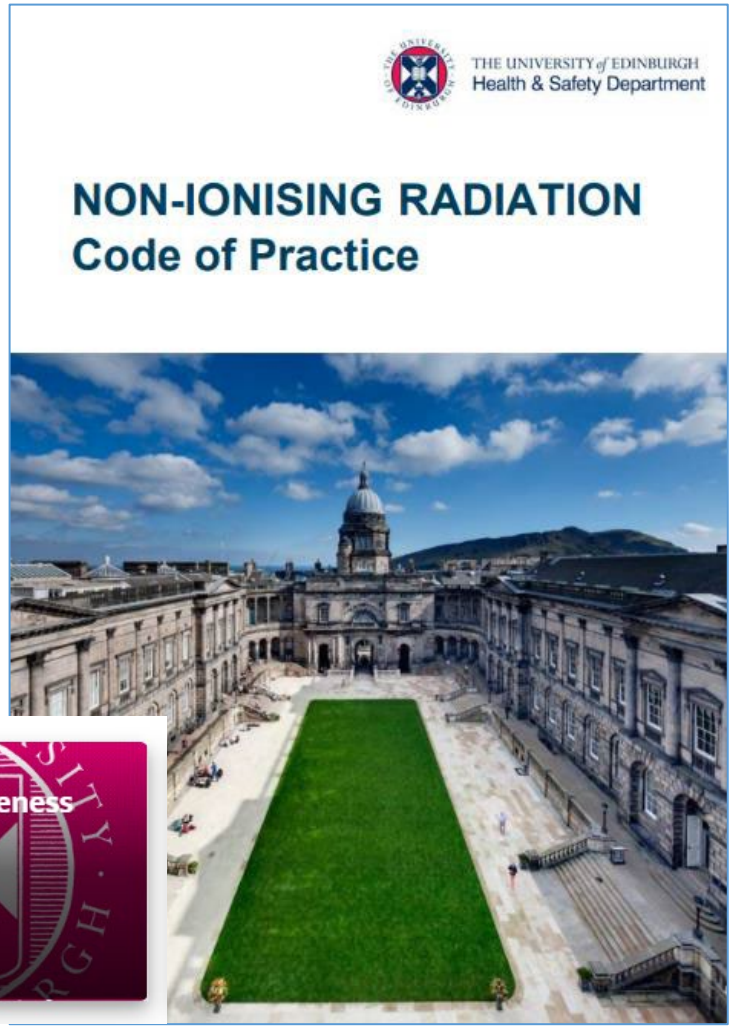
Poor storage / condition of PPE especially laser safety eyewear





Laser Safety

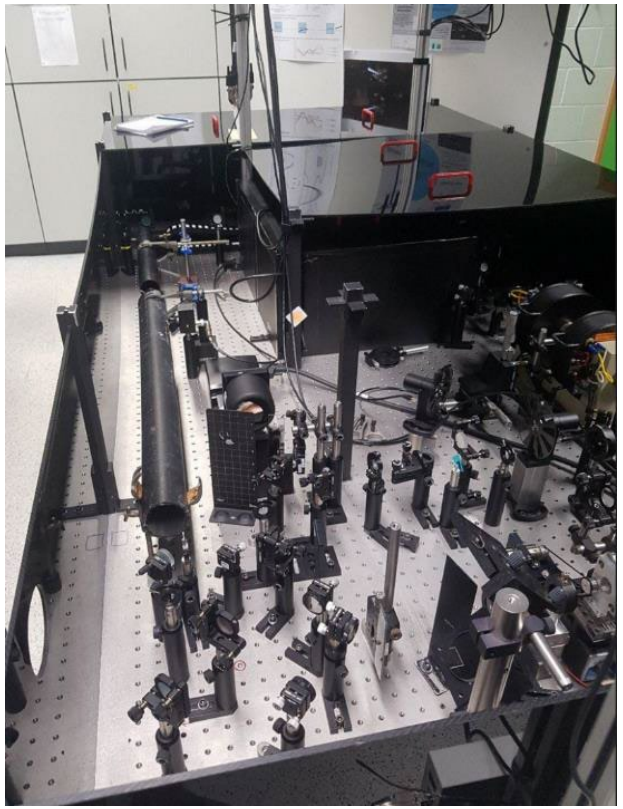
- Non-Ionising Radiation Code of Practice
  - Guidance Notes on Risk Assessment and Local Procedural Controls
- What's NEW?
  - RP GN 103 Signs and Labels for Lasers/Laser Facilities
  - RP GN 104 Laser Protective Eyewear
  - RP GN 111 Safe work with Laser processing machines (e.g. laser cutters)
  - Laser Safety Training
    - 2 new courses
    - In P&M search 'laser'



Laser Safety

- Engineering Controls 1st…

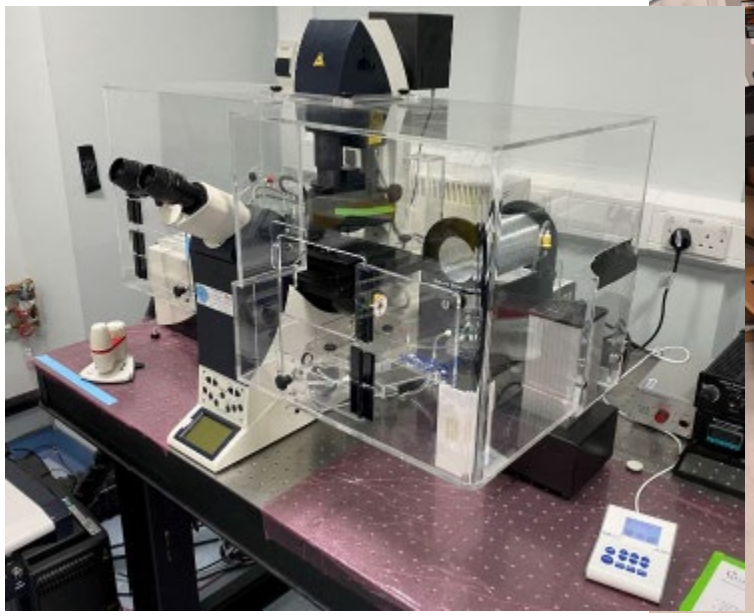
Before…

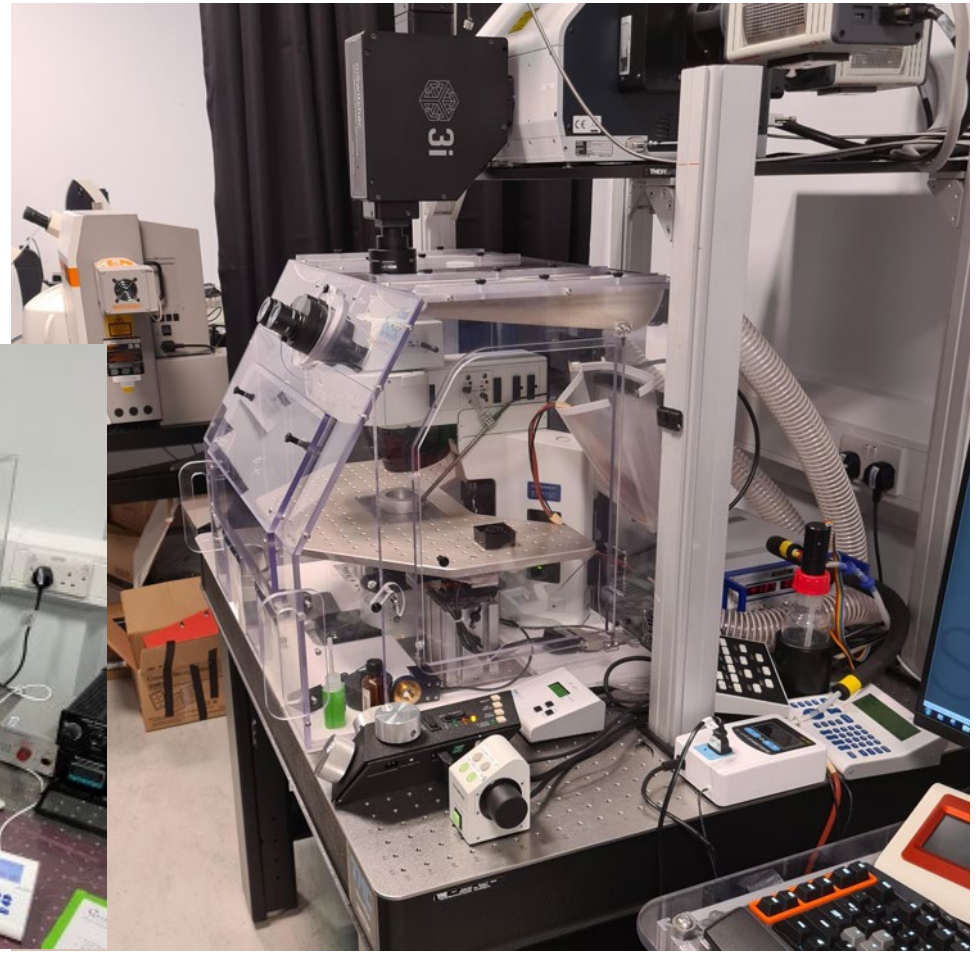


After…

Laser Safety

- Engineering Controls 1st…

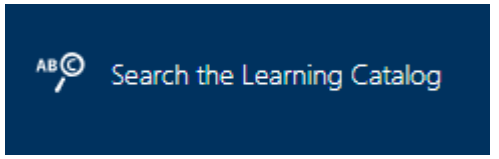




Electromagnetic Field (EMF) Safety

EMF Safety

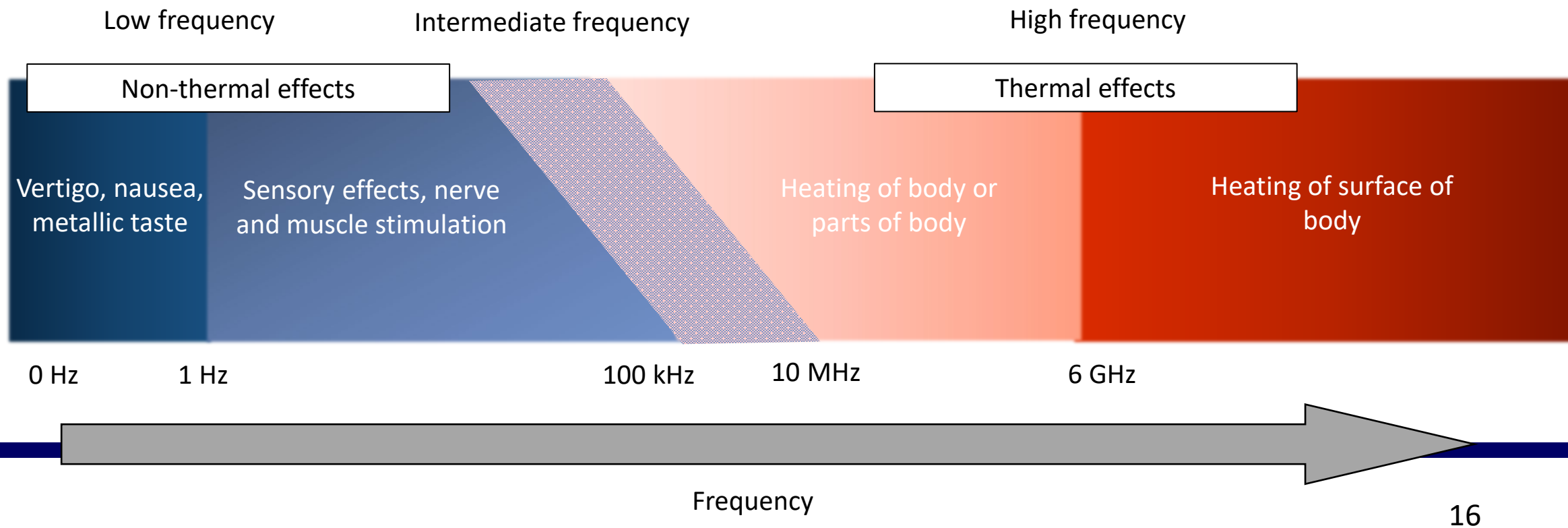
- New EMF Training Course
  - In P&M learning search ‘EMF’
  - Or link from RPU webpage:
  - https://www.ed.ac.uk/health-safety/radiation-protection/training/course-list
  - Useful for safety advisers to go through (1-1.5h)



- Course content – four modules
  - M1: An introduction to EMF Safety
  - M2: The nature of EMF and how it can cause harm
  - M3: Legislative Requirements
  - M4: Practical EMF Safety

EMF Safety

- How does EMF affect us?
  - Direct effects: Thermal and non-thermal

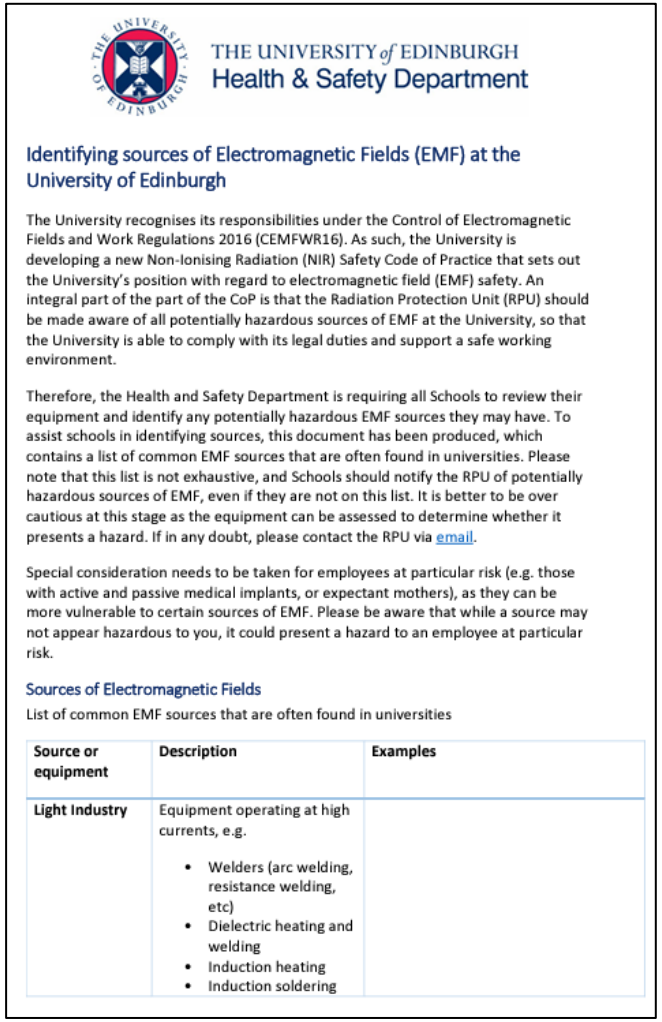


EMF Safety

- How does EMF affect us?
  - ~~Direct effects: Thermal and non-thermal~~
  - Indirect effects
    - Interference with medical equipment
    - Electric shock/burns from Contact currents
    - Projectile risk in strong magnetic fields
- Employees at particular risk
  - Active implanted medical devices
  - Passive implanted medical devices
  - Body worn medical devices
  - Expectant mothers

Practical EMF Safety

- What do I need to do?
- Carry out an 'Exposure Assessment'
  - First, identify any potentially hazardous equipment you might have in your areas
  - RPU Guidance Note of typical University equipment…
    - https://www.ed.ac.uk/health-safety/radiation-protection/codes-of-practice-and-guidance/guidance-notes
  - Flow chart in the NIR Code of Practice to assist
  - *Should* be quick and simple
  - If exposure assessment identifies ELVs could be exceeded, consider Risk Assessment / Controls



THE UNIVERSITY of EDINBURGH
Health & Safety Department

Identifying sources of Electromagnetic Fields (EMF) at the University of Edinburgh

The University recognises its responsibilities under the Control of Electromagnetic Fields and Work Regulations 2016 (CEMFWR16). As such, the University is developing a new Non-Ionising Radiation (NIR) Safety Code of Practice that sets out the University's position with regard to electromagnetic field (EMF) safety. An integral part of the part of the CoP is that the Radiation Protection Unit (RPU) should be made aware of all potentially hazardous sources of EMF at the University, so that the University is able to comply with its legal duties and support a safe working environment.

Therefore, the Health and Safety Department is requiring all Schools to review their equipment and identify any potentially hazardous EMF sources they may have. To assist schools in identifying sources, this document has been produced, which contains a list of common EMF sources that are often found in universities. Please note that this list is not exhaustive, and Schools should notify the RPU of potentially hazardous sources of EMF, even if they are not on this list. It is better to be over cautious at this stage as the equipment can be assessed to determine whether it presents a hazard. If in any doubt, please contact the RPU via email.

Special consideration needs to be taken for employees at particular risk (e.g. those with active and passive medical implants, or expectant mothers), as they can be more vulnerable to certain sources of EMF. Please be aware that while a source may not appear hazardous to you, it could present a hazard to an employee at particular risk.

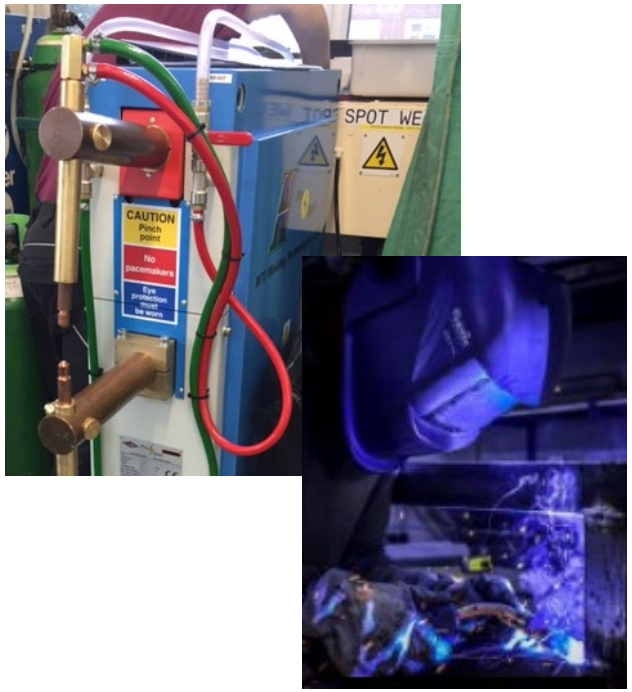
Sources of Electromagnetic Fields

List of common EMF sources that are often found in universities

Source or equipment	Description	Examples
Light Industry	Equipment operating at high currents, e.g. • Welders (arc welding, resistance welding, etc) • Dielectric heating and welding • Induction heating • Induction soldering	

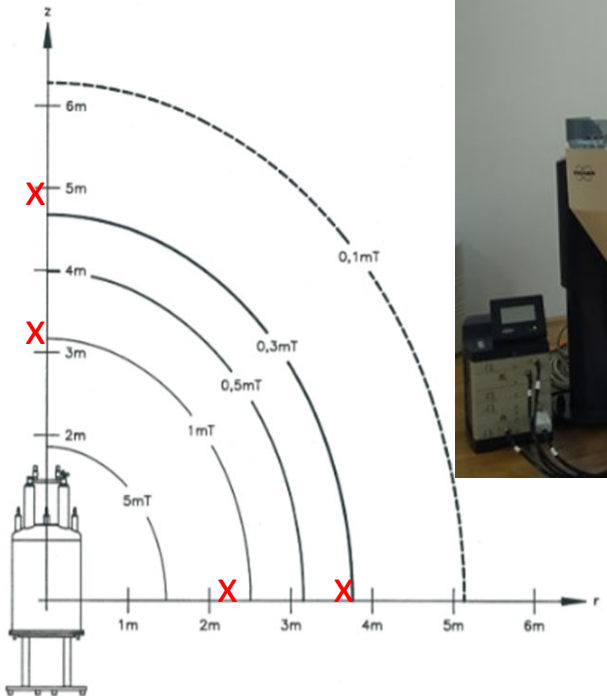
Practical EMF Safety

- Some common University examples…



Resistance/Arc Welding

Magnetic Stirrers



NMR Machines

ISTR Webinar

- When: 6th June 2024 13:00 – 17:00
- How do I register?
  - Visit ISTR website > Events
  - Institute of Safety in Technology and Research - Upcoming events (istr.org.uk)
- Agenda includes:
  - EMF equipment, regulations, guidance and Risk Assessment Process
  - EMF case studies
  - Optical/Laser equipment, regulations, guidance and Risk Assessment Process
  - Optical/Laser case studies
  - Communication and training including employees at particular risk

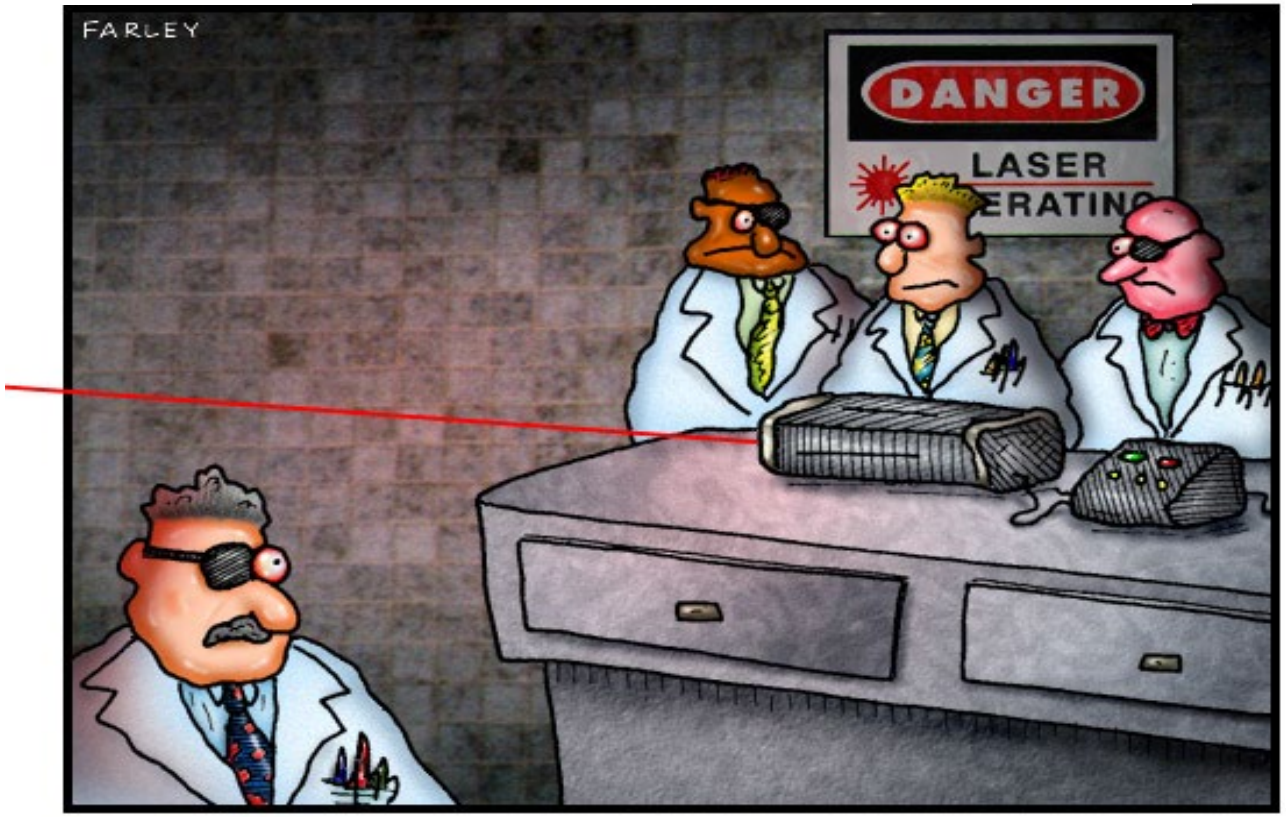
Institute of Safety in Technology and Research

THE SOCIETY FOR RADIOLOGICAL PROTECTION

Summary

- Laser Safety
  - Know what lasers you have in your areas
  - Ensure lasers are enclosed where practicable (Engineering > Procedural > PPE)
- Electromagnetic Field (EMF) Safety
  - What do you have? (check RPU Guidance Note)
  - Consult manufacturer data / carry out exposure assessments
- More RP training courses being added (UV / Gamma Irradiators)
- Lots more info in NIR Code of Practice
- If in doubt, contact the RPU radiation@ed.ac.uk

Thank you



Peer pressure in the laser lab