

# Imaging with Non-Ionising Radiation



# This talk:

- Imaging with Non-Ionising Radiation (INIR)
  - MRI
  - Ultrasound
  - Optical (UV and IR)
- An INIR Physicist's role
- INIR and the STP

# Magnetic Resonance Imaging

- MRI builds an image with an external applied field interacting with the nuclear spin of atoms inside patient



*Siemens Medical Solutions USA*

# Magnetic Resonance Imaging

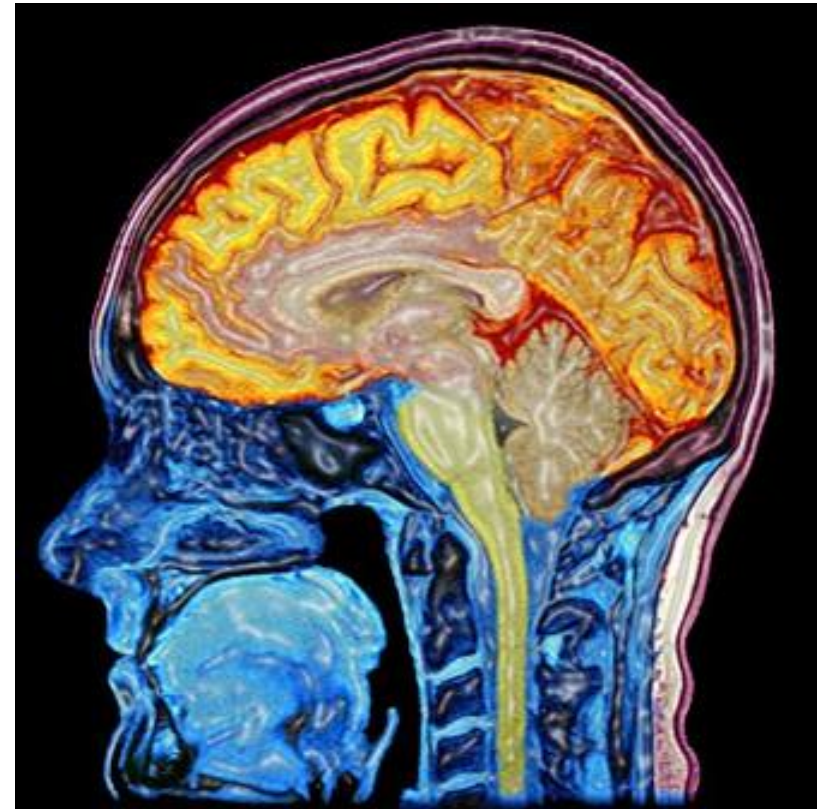
- The spins are ‘tipped over’ and emit energy when they realign themselves
- A smaller coil on the patient listens for the echoes from the atoms to create an image



*Siemens Medical Solutions USA*

# Magnetic Resonance Imaging

- Very detailed soft tissue contrast, such as muscles, brains, internal organs etc.
- Brain function
- Tumours
- Joint or ligament damage
- Bleeding
- Spinal fluid detection



*Wellcome Images (Creative Commons)*



# Ultrasound

- Mostly used for imaging
- Uses high frequency sound waves (MHz range) and “listens” for the echoes
- Can give “live” information such as blood flow etc.



*Koninklijke Philips N.V*



# Ultrasound Imaging

- Very low-risk for e.g. foetal scanning
- This is a foetal heart and aorta
  - It's actually as big as your thumb nail

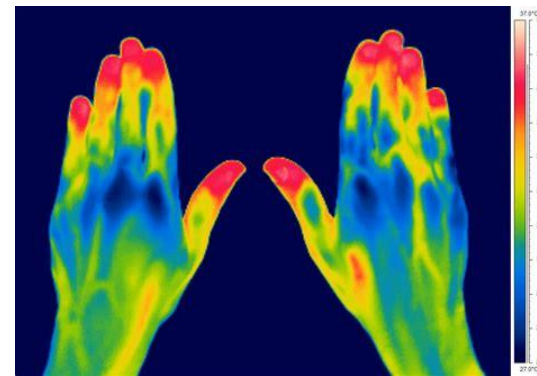


*Koninklijke Philips N.V*



# IR, UV and Lasers in Medicine

- Many other Non-Ionising applications in healthcare
- UV – To sterilise whole rooms and treat e.g. Psoriasis
- Lasers – To align patients in scanners and for surgery
- IR – Imaging peripheral vascular disorders





# Training in INIR on the STP

- Research and development plays a role too
  - Investigate new techniques for diagnosis and treatment
  - Perform and develop tests for Quality assurance
  - Develop software / hardware to help deliver the best care for the patients
  - Practical lab work, projects and case studies



# How did I get to the STP?

- Started with an MPhys in Astrophysics
- Did a PhD in theoretical physics and decided I didn't want to stay in academia
- No previous experience in medicine
- Applied in 2019—interviewed but no offer
- Went away and arranged a shadowing placement in a hospital
- Applied again in 2020—success!
- Visit the **NSHCS website** for more details.

