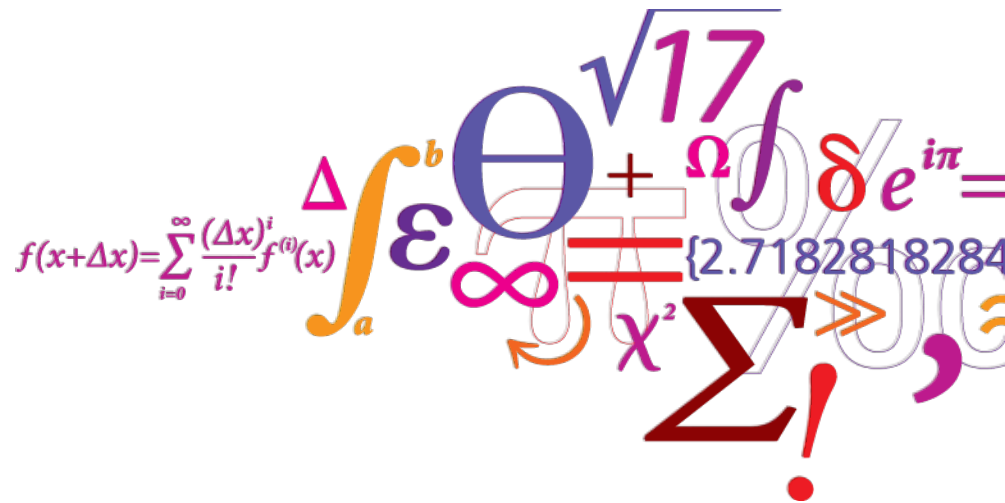


# Introduction to DTU Nutech – Center for Nuclear Technologies

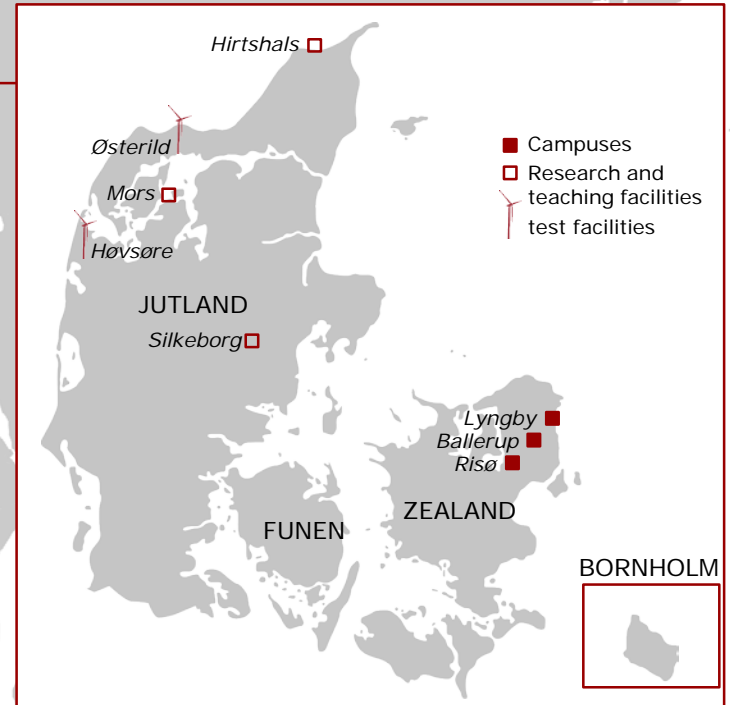
Jens-Peter Lynov  
Director





# Technical University of Denmark

- founded in 1829 by Hans Christian Ørsted



## Key figures

Student body  
**11,200**  
 - including PhD 1,300  
 - and int. MSc 1,600

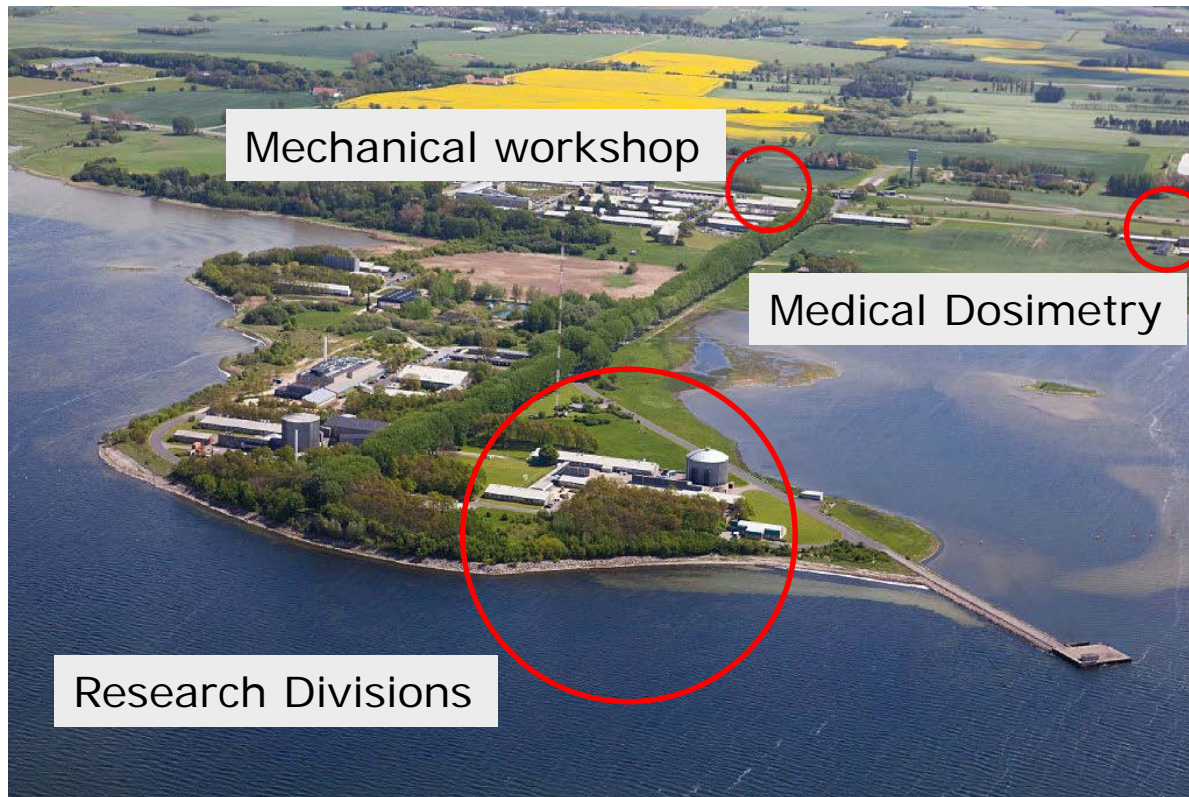
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Research publications  
**5,500**

## Ranking

Leiden Ranking 2017:  
**No 1** in the Nordic region  
**No 41** in Europe

# DTU Risø Campus

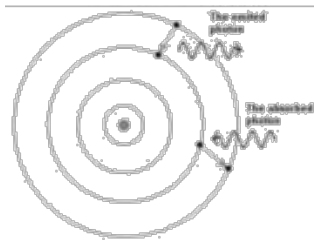


DTU Nutech is the Danish national competence center for nuclear technologies.

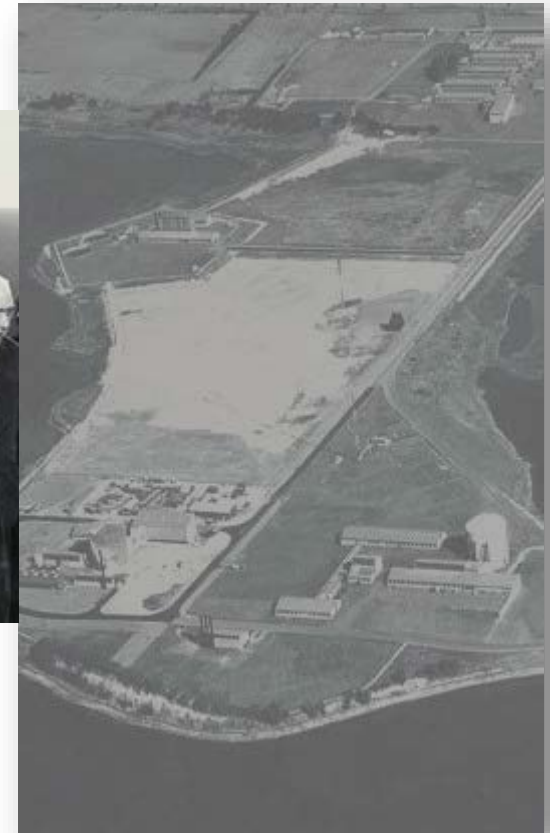
The aim of the center is to develop and utilize knowledge concerning radioactivity and ionizing radiation for the benefit of society.

# Nuclear technologies have been central at Risø from the very start

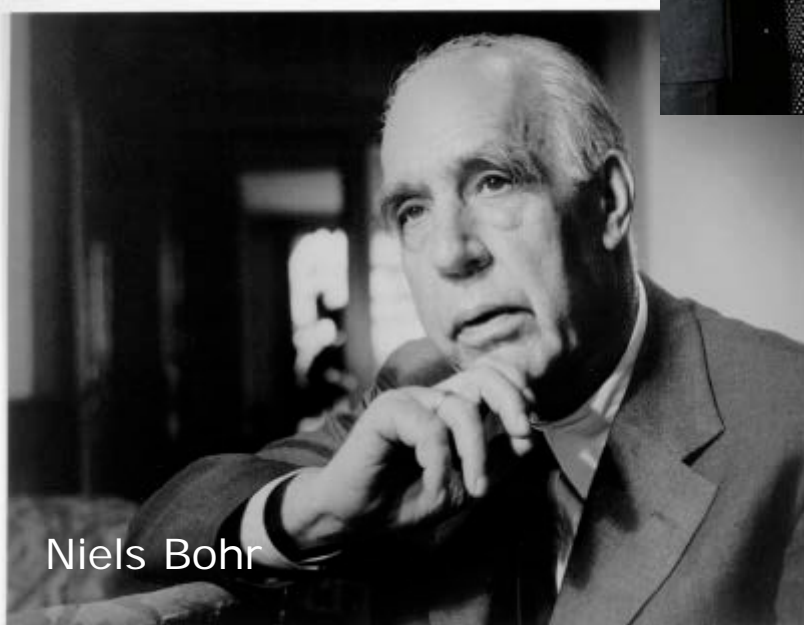
Peaceful utilization of nuclear power -  
3 research reactors



1958



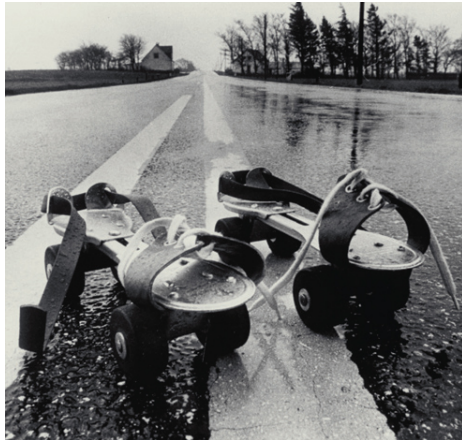
1959



Niels Bohr



# Risø's development



Car free Sundays

**1976** Nuclear power and other energy technologies

**1985** No nuclear power in Denmark

**1986** R&D with energy as main subject

**2000** Shut down of last reactor

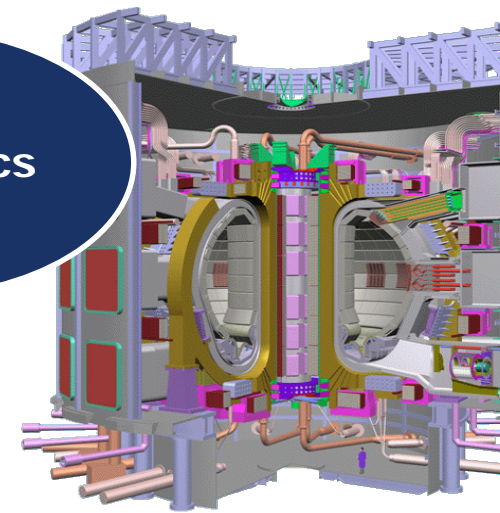
**2007** Risø part of DTU

**2012** DTU Nutech established



Nuclear Power- No Thanks

# Research at DTU Nutech



Dosimetry

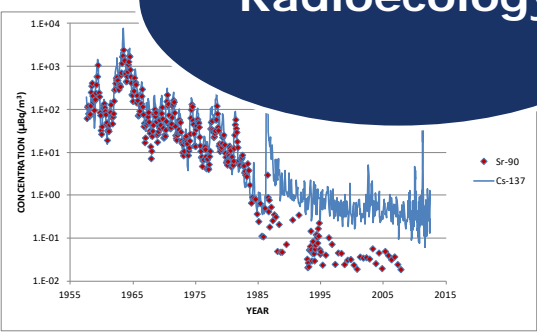
Neutronics

DTU Nutech

Medical isotopes

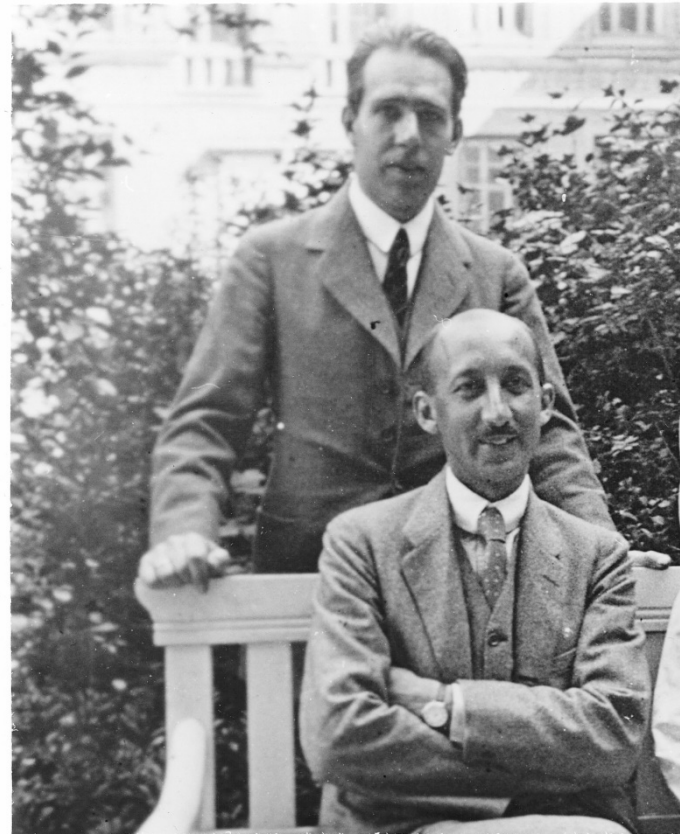
Luminescence Physics

Radioecology



## George de Hevesy (1885–1966)

Nobel prize in 1943 for the development of radioactive tracers to study chemical processes such as in the metabolism of animals



Bohr and Hevesy, 1923

# Radioecology – Studies of radioactivity in the environment

## Chemical analysis

- Separation of elements

## Radiation measurement

- Alpha, beta and gamma radiation

## Mass spectroscopy

- Stable and long-lived isotopes



## Monitoring of radioactivity in the Danish environment





# Radionuclide tracer measurements



## Ocean current studies

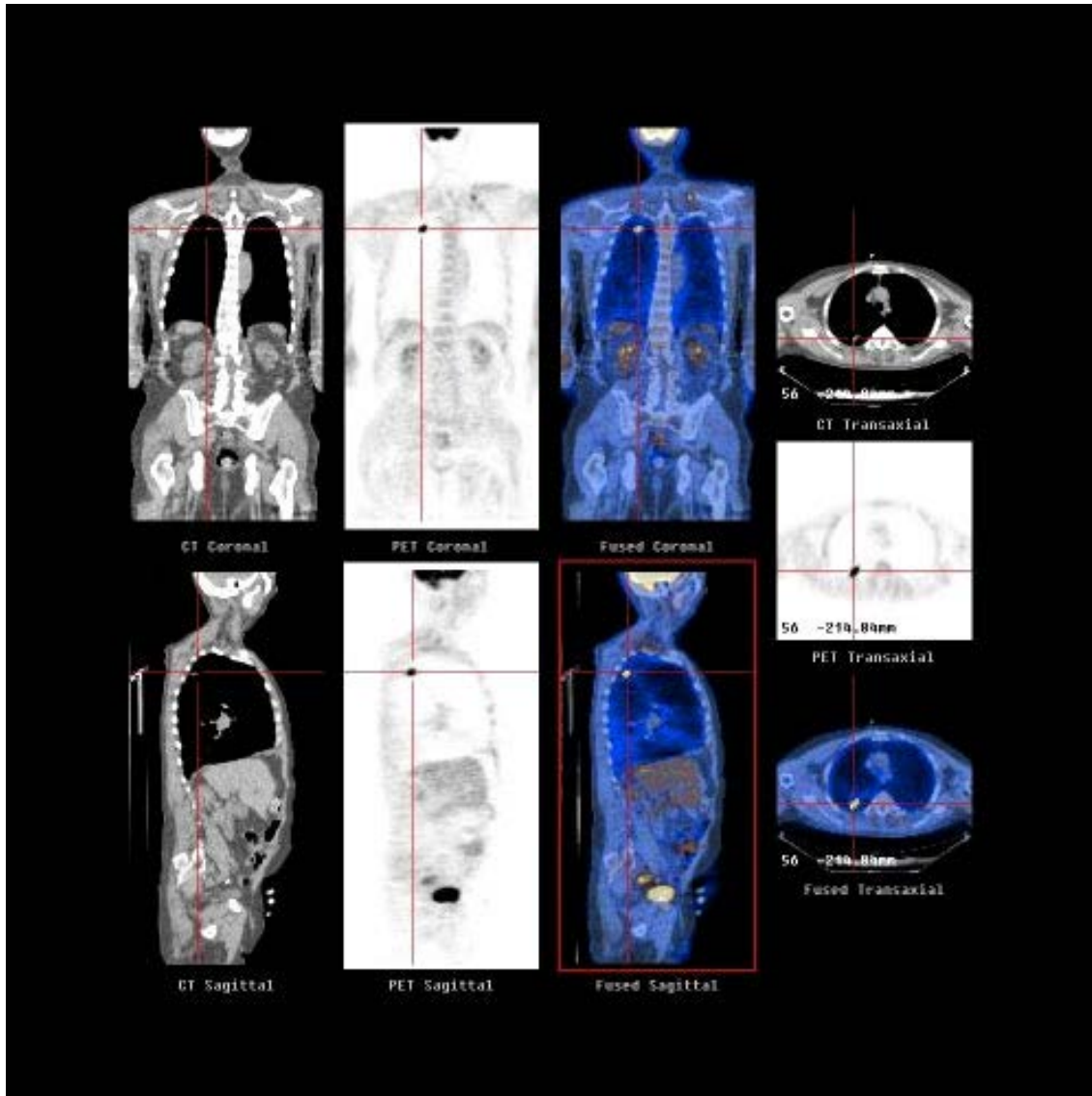
- Water circulation
- Exchange rates
- Transition time
- Transfer factors

M

R



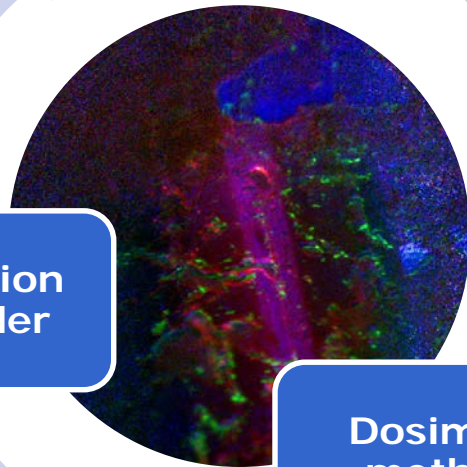
# X-ray and PET scanning



# Luminescence dosimetry



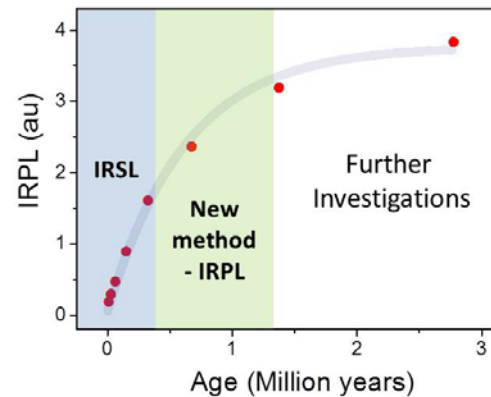
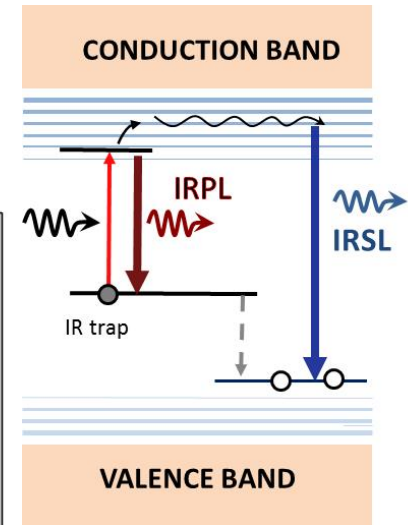
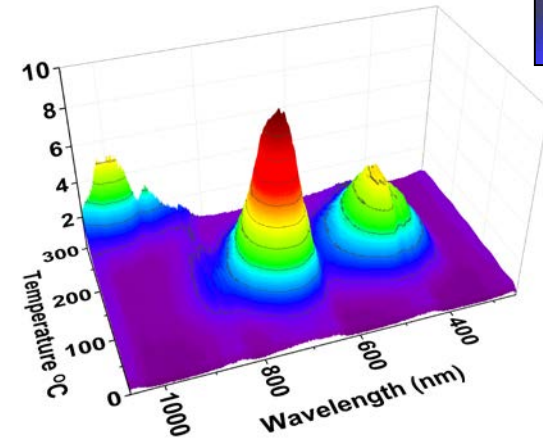
Luminescence  
Physics



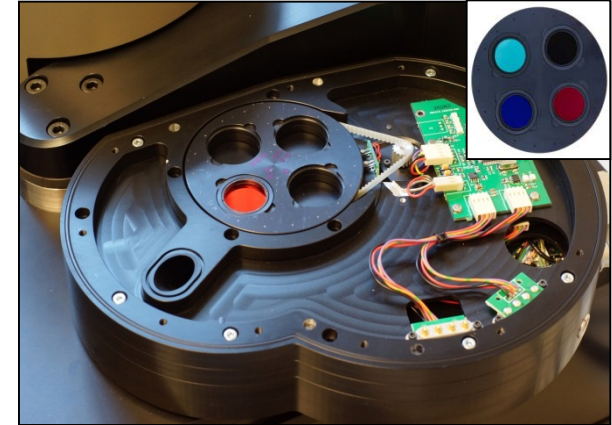
Instrumentation  
TL/OSL Reader



Dosimetry  
methods



# Luminescence instruments



iversity of Denmark



Risø TL/OSL Readers world-wide (2014)

# Luminescence Dosimetry

## Geochronology

*Climate Change*

*Risk assessment*

## Archaeological chronology

*Human evolution and migration*

*Culture*

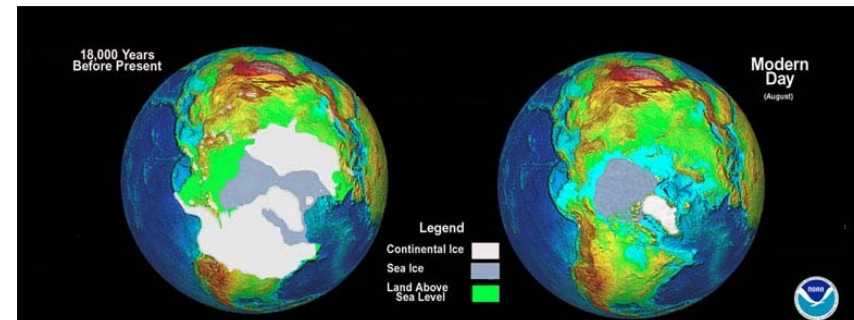
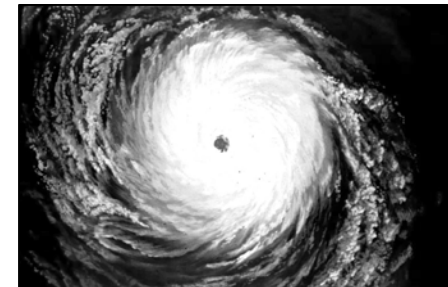
## Human dosimetry

*Medical*

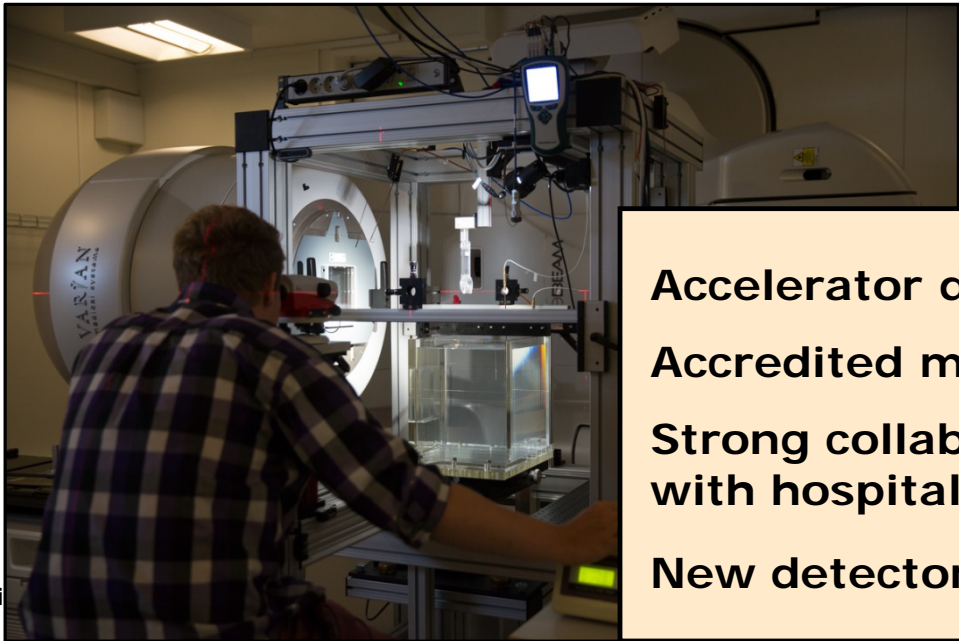
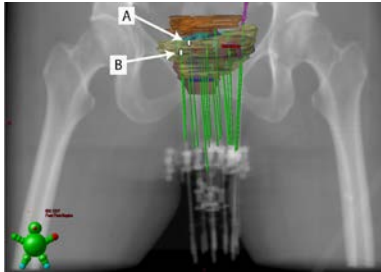
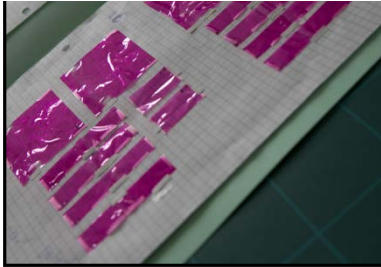
*Accident*

## Forensic Dosimetry

*Terrorism*



# Industrial and medical dosimetry



**Accelerator dosimetry**  
**Accredited meas. services**  
**Strong collaboration with hospitals and industry**  
**New detectors**



# Neutronics

Neutronics simulations  
NPPs, ITER, ESS, ...  
Public Sector Consultancy

