

# **SAINTS Short Course: Radiation Interaction and Detection (SC-RID)**



**SHORT COURSES**



**Monday 02 October 2023 - Friday 06 October 2023**

**Auditorium + Zoom**

## **Scientific Programme**

- Session 1: Fundamental particles and forces (1 lecture) [RTN]  
A brief overview of standard model of particle physics, conservation laws, energy units)
- Session 2: Foundational concepts (1 lecture) [RTN]  
Fundamental concepts of isotopes, isotones, isobars, radionuclides, chart of nuclides, nuclear decay, nuclear reactions, q-value, cross-section, luminosity, kinematics)
- Session 3: Charged particle interactions with matter (1 lecture) [RTN]  
Radiation sources, stopping power, range, brehmsstrahlung, energy loss, Bragg curve
- Session 4: Charged particle interactions with matter (1 lecture) [RTN]  
Radiation sources, photoelectric effect, Compton scattering, pair production, attenuation
- Session 5: Neutron Interactions with matter (1 lecture) [RTN]
- Session 6: Radiation Detectors and associated electronics (5 lectures) [PJ]  
Introduction to different types of detectors: Photon detectors - scintillation detectors, photomultipliers, efficiencies; Semiconductor detectors for particle and photon detection - Si, Ge, efficiency timing, energy resolution.  
Electronics: analogue signal processing and pulse shaping; pre-amplification.  
Digital electronics for instrumentation: ADC, DAC, Flash ADC,  
Digitization of detectors signals: FPGA, DSP, Signal deconvolution)