

## Presentation 9 – Session 3

# Carbon Ion Particle Therapy – From Accelerators to Medical Application

**Dr Dale Prokopovich**

Australian Nuclear Science and Technology Organisation (ANSTO)

### Biography

Dr Dale Prokopovich graduated from the University of Wollongong with a BSc (Hons) and BCompSc in 2002 and a PhD from Wollongong University in 2011 examining the use of SOI microdosimeters for space and aviation applications.

Dale has been working as a Physicist at ANSTO since 2004. His research focus has been on semiconductor radiation detectors for a variety of applications including solid state microdosimetry for use in particle therapy. Dale has active involvement in the development of the particle therapy proposals within Australia as part of the working groups and steering committees.



### Abstract

Particle therapy is gaining increasing usage internationally with particle therapy now being routinely used as a part of the radiotherapy protocols for cancer in several countries. Australia currently has several particle therapy proposals in development, including recent funding for a South Australian proton therapy and research facility. ANSTO and others are supporting the establishment of a National Particle Treatment and Research Centre. Unlike conventional X-ray therapy, which uses accelerated electrons to generate X-rays, particle therapy uses a particle accelerator to fire ions directly in a highly precise beam into the patient to spare healthy tissue and ensure conformity of the dose delivery.

Carbon ion therapy facilities use accelerated  $^{12}\text{C}$  ions because the carbon ions have a higher Relative Biological Effectiveness (RBE) when compared to X-rays or protons, as well as a better dose conformation to a tumour. An overview of different accelerator technologies and treatment delivery methods will be given as well as highlights of the latest developments for patient dose delivery technology.