

## International School on Nuclear Methods for Environmental and Life Science



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### PHYSICS AND TECHNOLOGY OF PROTON RADIOTHERAPY

The basic factor which determines the success of cancer radiotherapy is to deliver the highest possible dose of ionizing radiation (as recommended by the physician) to the tumour volume while sparing the neighbouring critical organs and healthy tissues. Accelerated protons are particularly useful in cancer treatment because of the phenomenon of the Bragg peak, i.e. a rapid increase of energy deposition in tissue at the end of the proton track. Another advantage of protons is that, due to their well-determined range, the unwanted doses to healthy organs are largely reduced as compared to high energy X-rays used in conventional radiotherapy. This is of particular importance to paediatric patients in whom the probability of later radiation-induced cancer should be minimized.

The two lectures will cover the following topics: (1) proton interactions with matter; (2) accelerators dedicated to proton therapy; (3) methods of beam delivery (4) reference and relative dosimetry of proton beams and (5) Quality Control and verification of proton range in radiotherapy.

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