

A Proton Computed Tomography Demonstrator for Stopping Power Measurements

Wednesday, May 26, 2021 9:30 AM (18 minutes)

Particle therapy is an established method to treat deep-seated tumours, using accelerator-produced ion beams. For treatment planning, the precise knowledge of the stopping power (SP) within the patient is vital. Conversion errors from x-ray CT measurements to SP introduce uncertainties in the applied dose distribution. Using a proton Computed Tomography (pCT) system to directly measure the SP could potentially increase the accuracy of treatment planning.

A pCT demonstrator, consisting of double-sided silicon strip detectors (DSSD) as tracker and plastic scintillator slabs coupled to silicon photomultipliers (SiPM) as a range telescope, was developed. After a major hardware upgrade of the range telescope, a 3D tomogram of an aluminium stair phantom was recorded at MedAustron.

Imaging results as well as current design studies for a new prototype, based on time-of-flight detectors, will be shown.

TIPP2020 abstract resubmission?

Funding information

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Session Classification: Technology Transfer

Track Classification: Technology Transfer