MEDIZINISCHE UNIVERSITÄT WIEN

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Invitation to the seminar on

Medical Radiation Physics and Ion-Beam Therapy

by

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Towards Clinical Implementation of Ion Beam Therapy for Cardiac Arrhythmias: Motion Management Strategies and Dosimetry

Ventricular tachycardia (VT) is a major cause of sudden cardiac death. While stereotactic radiotherapy has emerged as a promising non-invasive treatment for refractory cardiac arrhythmias, conventional photon therapy remains limited for deep-seated cardiac targets. Particle therapy may overcome these limitations through improved dose conformity and normal tissue sparing. To support the clinical implementation of cardiac radioablation at MedAustron, a customized dynamic phantom was developed in collaboration with Universitätsklinikum Schleswig-Holstein (UKSH) for end-to-end validation of gated proton and carbon ion treatments. The phantom simulates realistic cardiac motion and electrocardiogram (ECG) signals, enabling the evaluation of motion management and treatment delivery.
This lecture will present dosimetric verification studies using radiochromic film and ionization chambers, the development of accelerator control and beam-gating interfaces, and the first synchrotron-gated particle therapy deliveries using cardiac and dual-gating approaches in accordance with STOPSTORM recommendations. Additional investigations addressed positioning uncertainties, delivery latencies, ECG-triggered irradiation, and accelerator response to simulated tachycardia events. Beam gating improved agreement between planned and delivered dose distributions and increased dose homogeneity. The developed framework provides a platform for assessing delivery accuracy and robustness under realistic cardiac motion conditions, representing an important step toward the clinical implementation of particle therapy for cardiac radioablation.

Tuesday, 02. June 2026, 09:00 am

Zoom: https://tuwien.zoom.us/j/69660150906?pwd=FQRS8TnWx4hGuNEqjmVLfYostoOXLW.1

For updates, please register at: https://list.tuwien.ac.at/sympa/info/medaustron-seminar

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