

**EARLY-CAREER
RESEARCHERS IN MEDICAL
APPLICATIONS @ CERN –
SHORT TALKS**

Report of Contributions

Contribution ID: 1

Type: **not specified**

Introduction

Wednesday, October 6, 2021 2:00 PM (10 minutes)

Presenter: VRETENAR, Maurizio (CERN)

Contribution ID: 2

Type: **not specified**

Beam optics studies for GaToroid

Wednesday, October 6, 2021 3:00 PM (15 minutes)

Abstract:

GaToroid is a novel concept of a beam delivery system for hadron therapy. It comprises toroidal magnets to bend and focus the beam onto the patient location from a discrete number of directions. As GaToroid operates in a steady-state and consists of superconducting magnets, it can significantly reduce the complexity, cost, weight, and footprint of charged particle therapy systems.

Recent progress on the beam dynamics studies for GaToroid is presented. The incoming angles, and hence the reference trajectories for beams of various energies, are automatically determined. Subsequently, 3D particle tracking studies are performed to understand the beam optics to the first order. The linear transport matrix coefficients offer insights into the beam behaviour in the complex system and point towards the design optimization of the magnetic coils. Ultimately, some considerations on the upstream beamline elements are shown.

Presenter: OPONOWICZ, Ewa (CERN)

Contribution ID: 3

Type: **not specified**

Design of a 'bent linac' for carbon ion therapy

Wednesday, October 6, 2021 2:10 PM (15 minutes)

High-frequency linear accelerators are very suitable for carbon ion therapy, thanks to the reduced operational costs and the high beam quality with respect to synchrotrons, which are presently the only available technology for this application.

The 'bent linac', based on the latest accelerators technologies developed at CERN, introduces an innovative design tailored to better fit the accelerator footprint into existing hospital facilities and, at the same time, to provide a high quality, stable beam in the full range of operational energies.

Presenter: BENCINI, Vittorio (TERA Foundation (IT))

Contribution ID: 4

Type: **not specified**

How to design extraction from the NIMMS synchrotron

Wednesday, October 6, 2021 2:35 PM (15 minutes)

Abstract: The extraction of heavy ions for hadron therapy is crucial to provide a good quality beam which meets medical requirements. The design choices of slow extraction are explained in this talk, and extraction simulation results from a normal-conducting synchrotron are compared to results from existing hadron therapy accelerators.

Presenter: TAYLOR, Rebecca (Imperial College London)