



Contribution ID: 1560 Contribution code: THPR43

Type: Poster Presentation

## Towards the slow extraction of mixed He-2+ and C-6+ beams for online range verification

Thursday, 23 May 2024 16:00 (2 hours)

In recent years, mixed helium (He-2+) and carbon ion (C-6+) irradiation schemes have been proposed to facilitate in-vivo range verification in ion beam therapy. Such a scheme proposes to accelerate and extract both ion species simultaneously, with the idea of using C-6+ for tumor treatment, while performing real-time dosimetry with He-2+ in a detector downstream of the patient.

The MedAustron center for ion beam therapy and research, which supplies protons and carbon ions for clinical treatment, is currently being commissioned to additionally provide helium ions for nonclinical research. The availability of both He-2+ and C-6+ beams opens the opportunity for studying the feasibility of the described mixed beam irradiation scheme. A key aspect in this context is the slow extraction of the ion mix, which is affected by both the relative charge-to-mass ratio offset of approximately  $6e-4$  and potential differences in the transverse phase space distributions. This contribution discusses requirements for maintaining a specified ion ratio throughout the spill, presents first simulation results and summarizes preliminary assessments on the applicability of different extraction mechanisms.

### Footnotes

### Funding Agency

### Paper preparation format

LaTeX

### Region represented

Europe

**Primary author:** RENNEN, Elisabeth (TU Wien)

**Co-authors:** SCHMITZER, Claus (EBG MedAustron GmbH); PLASSARD, Fabien (EBG MedAustron GmbH); KUEHTEUBL, Florian (EBG MedAustron GmbH); WOLF, Markus (EBG MedAustron GmbH); KAUSEL, Matthias (EBG MedAustron GmbH); KIRCHWEGGER, Valentin (Vienna University of Technology)

**Presenter:** RENNEN, Elisabeth (TU Wien)

**Session Classification:** Thursday Poster Session

**Track Classification:** MC4: Hadron Accelerators: MC4.T12 Beam Injection/Extraction and Transport