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## Beam properties beyond the therapeutic range at HIT

*Thursday, 11 May 2023 16:30 (2 hours)*

The Heidelberg ion beam therapy facility HIT has more than ten years experience in patient treatment. More than 7800 patients have been treated with protons and heavy ions, about 700 are treated every year.

Outside the beam time dedicated to therapy, quality assurance (QA) and machine tuning, we provide beams for a large spectrum of experiments in physics, biology and medicine which make use of various ion beam settings apart from the therapeutic application.

By slow extraction the HIT synchrotron produces a wide range of spill lengths between a few ms and more than 10s. The intensity can be varied accordingly: For biological FLASH-radiation experiments we provide more than  $2e9$  carbon ions/s, still applying the high-quality raster-scanning beam delivery method. On the other hand, we deliver very stable low intensity beams in the order of 1000 ions/s if sensitive detector equipment is mounted.

The layout of the facility was done for therapeutic ion beams with a maximum beam energy that corresponds to a penetration depth of  $\approx 30$ cm in water and tissue accordingly. Especially for developments in ion beam radiography we now commissioned beams with higher energies for the light ions available at HIT (p, He).

This paper summarizes the large variety of accelerator settings for the different experimental activities.

### Funding Agency

### Footnotes

### I have read and accept the Privacy Policy Statement

Yes

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