

## THE MEDAUSTRON PARTICLE THERAPY ACCELERATOR

**Mauro PIVI, Laurids ADLER, Dale PROKOPOVICH, Nadia GAMBINO, Greta GUIDOBONI, Florian KÜHTEUBL, Christoph KURFÜRST, Clemens MADERBÖCK, Szymon MYALSKI, Fabien PLASSARD, Valeria RIZZOGLIO, Claus SCHMITZER, Thomas SCHREINER, Ivan STRASIK, Alexander WASTL, Markus WOLF**

*MedAustron, Marie Curie Straße 5, 2700, Wiener Neustadt, Austria*

The MedAustron Particle Therapy Accelerator located in Austria, delivers proton beams in the energy range 60-250 MeV/n and carbon ions 120-400 MeV/n for medical treatment in three irradiation rooms, clinically used for tumour therapy. Proton beams up to 800 MeV/n are also provided to a room dedicated to scientific research. Following beam generation at the ion sources and pre-acceleration, the beam is injected into a 77 m long synchrotron, that accelerates particles up to the required energy for clinical treatment. A 3rd-order resonance slow extraction is used to extract particles from the synchrotron in a controlled process and transfer the beam to 4 irradiation rooms with a spill length 1÷10 seconds, to facilitate the control of the delivered dose to the patient.

Over the last two years, in parallel to clinical operations, we have completed the installation and commissioning of the proton gantry beamline in a dedicated room, with the first patient just recently treated in May 2022. In this manuscript, we provide an overview of the MedAustron gantry beam commissioning including the world-wide first “Rotator” system, a rotating beamline located upstream of the gantry and used to match the slowly extracted non-symmetric beams into the coordinate system of the gantry.

With the recent addition of the Gantry, the MedAustron facility is now fully operational and providing beams in all rooms to patients and to research teams. A review of the facility and future performance and improvement projects is given.