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First Injector Commissioning Results with Helium Beam at MedAustron Ion Therapy Center

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MedAustron is a synchrotron-based Particle Therapy Accelerator located in lower Austria which delivers clinical proton and carbon beams in the range of 62-252.7 MeV/u and 120-400 MeV/u respectively in two treatment rooms. A proton Gantry was recently commissioned in a third clinical treatment room and a fourth experimental beamline is dedicated to non-clinical research activities. Within the latter, the injector commissioning has recently started for He²⁺ beam generation. The long-term goal is to use helium for cancer treatment due to its favourable physical and biological properties. The MedAustron injector features three identical Electron Cyclotron Resonance Ion Sources (ECRIS) from Pantechnik, providing each a 8 keV/u beam. Two sources are respectively used for proton and carbon beams production. The third source is the test bench for helium beam generation. In this work the first He²⁺ beam commissioning results at the injector level are presented. The helium beam properties from the source up to injection further downstream into the accelerator, i.e. from the Low Energy Beamline to the Linear Accelerator are discussed in terms of beam emittance, intensity and transmission efficiency. A comparison with simulated data is also presented.

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