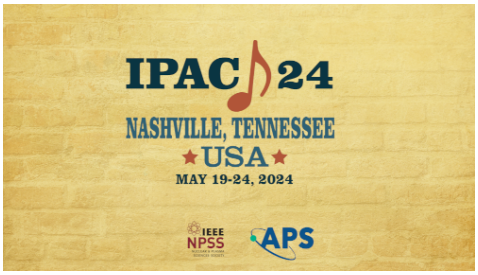

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A double multiturn injection scheme for mixed helium and carbon ion beams

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

With a very low relative charge-to-mass ratio offset of approximately 6e-4, helium (4He-2+) and carbon ions (12C-6+) are interesting candidates for being simultaneously accelerated in hadron therapy accelerators. At the same energy per nucleon, helium ions exhibit a stopping range approximately three times greater than that of carbon ions and can therefore be exploited for online range verification in a detector downstream of the patient during carbon ion radio therapy.
The synchrotron-based MedAustron Ion Therapy Center provides the opportunity to study the feasibility of such a mixed beam based in-vivo range verification system due to the availability of 120-402 MeV/u carbon beams and the ongoing commissioning of 39-402 MeV/u helium beams. One possibility for creating this mixed beam is accelerating 4He-2+ and 12C-6+ sequentially through the LINAC and subsequently "mixing"the ion species at injection energy in the synchrotron with a double injection scheme. This contribution introduces this newly proposed injection scheme, outlines challenges and presents first feasibility estimates obtained through measurements and particle tracking simulations.

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