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## Present Status of HIMAC Injector

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Carbon-ion radiotherapy using Heavy Ion Medical Accelerator in Chiba (HIMAC) has been carried out since 1994. Over 11000 cancer patients have been treated with carbon beams having energies of between 56-430 MeV/u. The HIMAC has two injectors and provides heavy-ion beams for medical and experimental purposes. The first injector consists of two Electron-Cyclotron-Resonance (ECR) type ion-sources, one Penning-Ion-Gauge (PIG) type ion-source, the Radio Frequency Quadrupole (RFQ) linac and the drift tube linac (DTL). This injector provides carbon-ion beam for cancer therapy, and concurrently provides various ion beams such as H, He, Fe, Xe for biological and physical experiments. The 10 GHz NIRS-ECR ion-source produces the carbon ion for cancer therapy, while the 18 GHz NIRS-HEC ion-source produces C to Xe ions for experimental use. Light ions such as H and He, moreover, B and Si ions are produced from solid materials with sputtering method by the NIRS-PIG ion-source. The second injector consists of the compact ECR ion-source with all permanent magnets, the RFQ linac and the Alternating-Phase-Focused Interdigital H-mode Drift-Tube-Linac (APF IH-DTL). This injector mostly provides carbon-ion beams for experimental use. In this paper, present status as well as recent development of the injectors will be described.

**Primary author:** Dr MURAMATSU, Masayuki (National Institutes for Quantum Radiological Science and Technology, National Institute of Radiological Sciences (QST-NIRS))

**Co-authors:** Mr SASANO, Toshinobu (Accelerator Engineering Corporation (AEC)); Mr SHIRAISHI, Tadahiro (Accelerator Engineering Corporation (AEC)); Mr TAKAHASHI, Katsuyuki (Accelerator Engineering Corporation (AEC)); Mr SUZUKI, Taku (Accelerator Engineering Corporation (AEC)); Mr SUZUKI, Seitaro (Accelerator Engineering Corporation (AEC)); Mr HASHIZAKI, Shinpei (Accelerator Engineering Corporation (AEC)); Mr OUCHI, Fumihisa (Accelerator Engineering Corporation (AEC)); Mr II, Hiroshi (Accelerator Engineering Corporation (AEC)); Mr SEI, Michitaro (Accelerator Engineering Corporation (AEC)); Mr KAWASHIMA, Masahiro (Accelerator Engineering Corporation (AEC)); Dr KITAGAWA, Atsushi (National Institutes for Quantum Radiological Science and Technology, National Institute of Radiological Sciences (QST-NIRS)); Mr SATO, Shinji (National Institutes for Quantum Radiological Science and Technology, National Institute of Radiological Sciences (QST-NIRS)); Dr TAKADA, Eiichi (National Institutes for Quantum Radiological Science and Technology, National Institute of Radiological Sciences (QST-NIRS)); Dr MIZUSHIMA, Kota (National Institutes for Quantum Radiological Science and Technology, National Institute of Radiological Sciences (QST-NIRS)); Dr INANIWA, Taku (National Institutes for Quantum Radiological Science and Technology, National Institute of Radiological Sciences (QST-NIRS)); Dr IWATA, Yoshiyuki (National Institutes for Quantum Radiological Science and Technology, National Institute of Radiological Sciences (QST-NIRS))

**Presenter:** Dr MURAMATSU, Masayuki (National Institutes for Quantum Radiological Science and Technology, National Institute of Radiological Sciences (QST-NIRS))

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