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Development of He²⁺ 10GHz ECR Ion Source for astatine generation accelerator

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Tokyo Institute of Technology is planning a linac facility to produce ²¹¹astatine, an isotope for α emitter cancer therapy. To produce astatine, we aim to bombard a bismuth target with helium ion beam of sufficient intensity at 28 MeV. Unlike a cyclotron, this facility will be able to accelerate a milliampere class high intensity helium ion beam. In addition, the subsequent accelerator system can be made compact by providing fully stripped helium ions. For this purpose, the ECR ion source is best suited. The multiply charged ions are generated by resonant absorption of microwaves by electrons orbiting in a magnetic field and are capable of supplying high-intensity beams. The ECR ion source will use an RF frequency of 10 GHz, and a suitable magnetic field distribution will be designed to confine the plasma by a composite magnetic field consisting of a mirror field using two solenoid coils and a magnetic field generated by a sextupole magnet to increase the charge states of the ions in the chamber. The final goal is to extract He²⁺ at 15 mA. In this presentation, the design and magnetic field distribution are reported.

Funding Agency

Footnotes

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Yes

Primary author: KIKUCHI, Sosuke (Research Laboratory for Nuclear Research)

Co-authors: NAGAE, Daisuke (RIKEN Nishina Center); HAYASHIZAKI, Noriyosu (Research Laboratory for Nuclear Research)

Presenter: KIKUCHI, Sosuke (Research Laboratory for Nuclear Research)

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