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Analysis of beam characteristic variations in the 14.5 GHz ECR ion source at RAON

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RAON (Rare isotope Accelerator complex for ON-line experiments) is a heavy ion accelerator under construction in Daejeon, South Korea. RAON plans to operate a 28 GHz Electron Cyclotron Resonance Ion Source (ECRIS) with a fully superconducting magnet and is currently operating a 14.5 GHz ECR ion source with a fully permanent magnet. The 14.5 GHz ECRIS was manufactured by PANTECHNIK and installed in our beamline in September 2020. The initial beam conditioning of RAON was conducted using the 14.5 GHz ECR ion source with $^{40}\text{Ar}^{9+}$ and $^{40}\text{Ar}^{8+}$ beams. Additionally, beam tests were performed with protons, $^4\text{He}^{2+}$, and oxygen. During these experiments, an unusual phenomenon was observed: the characteristics of the beam changed despite no variations in the parameters. This was consistently noted during some of the beam tests. We hypothesized several potential causes for this phenomenon and analyzed them through experiments. In this paper, we discuss the results of these analyses.

Footnotes

Funding Agency

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Yes

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