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The CUBE-ECRIS Prototype - Towards a 100 GHz ECRIS

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The vast majority of the ECRIS are based on magnetic confinement with solenoid and sextupole field components. The development of such structure using present superconducting wire technology is limited to 56 GHz, whereas the minimum-B quadrupole ARC-ECRIS topology has been theoretically shown to enable up to 100 GHz operation. The CUBE-ECRIS is a recently commissioned permanent magnet implementation of the quadrupole topology and it has been used to demonstrate the applicability of the concept as a high charge state ion source. This work introduces technological challenges specific to the concept, especially the slit beam extraction system necessary due to beam formation at a line-shaped plasma loss. We present the most recent performance measurements of the ion source with measured charge state distributions for helium, argon, krypton and xenon. We show emittance measurements and analyze them together with transmission efficiency measurements with the aid of beam formation and transport simulations. Optional beam transport solutions for the slit beam are also presented. An outlook is presented with the next steps of the CUBE project being beam transport studies with a permanent magnet dipole and a possible upgrade to a 14 GHz permanent magnet CUBE.

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Yes

Presenter if not the submitter of this abstract

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