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Electron Cyclotron Resonance Supernanogan Ion Source Commissioning for the Sarajevo Ion Accelerator (SARAI)

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The Sarajevo ion accelerator (SARAI) comes as a result of a successful transfer of the CERN's 750 MHz radiofrequency quadrupole (RFQ) technology, adapted for societal and medical applications. Designed to generate alpha particles and ions with a charge-to-mass ratio of 1/2 for ion beam analysis research, SARAI incorporates an industrial electron cyclotron resonance supernanogan ion source operating at 14.5 GHz. The system is equipped with a pentode extraction system capable of extracting and focusing multiple ion species at voltages up to 30 kV. The source has been optimized at CERN for injection into an existing 750 MHz, 2.5 MeV/u RFQ with an overall acceptance of 0.25 mm mrad normalised, initially with protons, followed by helium and carbon ions. This paper focuses on comparing the experimental results obtained during source commissioning to beam dynamics simulation of the source extraction system.

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