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## **High-intensity Superconducting ECR Ion Source SECRAL**

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RIB accelerator requests high power primary ion beam which actually very much depends on performance of the front-end ion source. SECRAL (Superconducting Electron Cyclotron Resonance ion source with Advanced design in Lanzhou) is a superconducting-magnet-based ECRIS (Electron Cyclotron Resonance Ion Source) for the production of intense highly-charged heavy ion beams. It is one of the best performing ECRISs worldwide and the first superconducting ECRIS built with an innovative magnet to generate a high strength Minimum-B field for operation with heating microwaves up to 24-28 GHz. SECRAL has so far produced a good number of CW (Continuous Wave) intensity records of highly-charged ion beams, in which the beam intensities of  $40\text{Ar}^{12+}$  and  $129\text{Xe}^{26+}$  have exceeded 1 emA for the first time by an ion source. The great performance of SECRAL is accumulation of a number of technical advancements, such as the innovative magnet system for better plasma confinement and more effective double-frequency (24+18 GHz) heating with an optimized 24 GHz wave coupling to operate at higher wave power with improved plasma stability. SECRAL source has run into operation to deliver highly charged ion beams for HIRFL accelerator for more than 9 years and total beam time more than 30000 hours, which has demonstrated its excellent stability and reliability. This talk will present the innovative magnet structure and the latest development of SECRAL ECR ion source.

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