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High Power Operation of Superconducting ECR ion Sources

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Third generation ECR (Electron Cyclotron Resonance) ion sources developed with high field, high frequency and high power technologies are aiming to produce intense highly charged ion beams for accelerators. Operating at 24~28 GHz, those ion sources have the potentials to be heated with microwave power of ~10 kW which is essential for the production of very high charge state ion beams. Scientific researches and accelerator operation at IMP inquire the superconducting ECR ion sources capable of running at the conditions close to their peak performances. Recently, ~300 eμA Kr²⁶⁺, ~200 eμA Xe³²⁺ and ~6 eμA Ar¹⁸⁺ beams have been continuously delivered by the ion sources SECRAI-II and SECRAI-I. This paper will present the status of the ion sources routinely operated at high power up to 8 kW. Challenges and critical issues for long-term high power operation will be discussed.

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