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Progress on the Development of Key Technologies for the 4th Generation ECR Ion Source FEER

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A 4th generation ECR ion source FEER is under development at IMP. Aiming to be operated with the microwave power of 20 kW at 45 GHz, FEER is equipped with a fully superconducting Nb₃Sn magnet and conventional parts durable for high power ECR plasma heating and optimum for intense beam production and extraction. Breakthroughs on the Nb₃Sn superconducting magnet, high power density plasma chamber, high temperature oven, and so on have been successfully demonstrated recently. The prototype Nb₃Sn cold mass has been successfully tested. The plasma chamber with an innovative structure of micro-channel cooling structure has been tested which enables the SECRAL-II ion source operated continuously for more than 1,100 hours with ~300 eμA Kr²⁶⁺ for routine operation. A high temperature inductive heating oven has also been developed and used for intense uranium beam production. This talk will present the recent progress on the development of key technologies for the 4th generation ECR ion source.

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