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## Superconducting Magnets for High Performance ECR Ion Sources

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High charge state ECR ion source has become an indispensable machine in heavy ion associated physics research. It has got remarkable advancement in the last several decades. Modern heavy ion accelerator technology needs very intense highly charged heavy ion beams, therefore very high performance ECR ion sources are needed by many large scale heavy ion facilities. So called 3rd generation ECR ion source whose magnet built with the state of the art NbTi technology represents the cutting edge technology of ECR ion sources. Latest nuclear physics research are demanding more powerful ECR ion source, therefore the ECR sourcers are tackling the 4th generation machine which is symbolized by a sophisticated sextupole magnet built with high performance Nb<sub>3</sub>Sn wires. This paper will present the existing worldwide development of high performance superconducting ECR ion sources, and the challenges in developing such kind of magnet. The development activities of both 3rd and 4th generation ECR ion source magnets at IMP will be discussed in detail.

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