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Magnet System Design for the New 18 GHz ECR Ion Source at GSI

In order to increase intensities and charge states of available ion species, a new room-temperature ECR Ion Source (ECRIS) operating at 18 GHz is currently under development at GSI. The new ECRIS is based on a Heavy Ion Ion Source Injector (HIISI), developed at the Department of Physics, University of Jyväskylä (JYFL), and features three normal conducting coils and a permanent magnet hexapole for plasma confinement. The latter has to be installed inside a refrigerated hexapole chamber, allowing to achieve the required radial confining field and avoiding demagnetization of permanent magnets. Computer simulations are carried out with Opera software package for two Halbach hexapole arrangements and the resulting three-dimensional magnetic fields are compared. The demagnetization of permanent magnets due to the superposition of fields generated by the coils and the hexapole is also simulated for both arrangements.

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