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Development of High-Temperature Superconducting REBCO Coils for ECR Ion Sources

A new High-Temperature Superconducting ECR (HTS-ECR) ion source is under development in Research Center for Nuclear Physics(RCNP), Osaka University, for production of high intensity proton, deuteron and helium ion beams. The HTS-ECR magnets are composed of three solenoid coils and a set of sextuple coils made of REBCO high-temperature superconductor. The HTS-ECR ion source was designed to operate at frequency of 2.45 GHz and 10 GHz by adjusting the current of the solenoid coils. Performance tests of the HTS coils were carried out at 30K and 77K. This HTS coil technology will be applied to development of a meter-size HTS coil system of a high intensity compact AVF cyclotron. This paper introduces the basic design of the HTS-ECR ion source. Superconducting properties of the REBCO mirror coils and sextuple coils will also be presented.

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