

HTS Magnets for an ECR Ion Source

Scientific Magnetics has designed and manufactured a pair of high temperature superconducting (HTS) magnets for an electron cyclotron resonance (ECR) ion source. The two magnets are independently powered and cooled, allowing precise profiling of the field within the source. Both systems are entirely cryogen-free, cooled purely by conduction to single-stage Gifford-McMahon cryocoolers. Operating at a temperature of 23 K, the coils generate a maximum field on the axis of 1.8 T, while the peak field on the superconductor is more than 3.0 T.

The coils were designed to replace resistive windings inside an existing ion source, in order to reduce the power consumption. All requirements were met: the power consumption was reduced from 200 kW to the 11 kW needed for the cryocooler compressors.

Features

- Turn-key system
- Cryogen-free
- Two coils energised independently
- 1.8 T field on axis



SM 3-D Vector Magnet

Specification

Conductor	BSCCO-2223
Operating temperature	23 K
Operating current	181 A/145 A
Maximum field on the axis	1.8 T
Maximum field on conductor	3.0 T
Inner coil diameter	240 mm
Outer coil diameter	320 mm