Contribution ID: **1074** Type: **Poster Presentation of 1h45m**

A Study on the Sextupole Design with Iron Yoke inside Solenoids for 56 GHz ECR Ion Source

Thursday, 31 August 2017 13:45 (1h 45m)

The third generation of electron cyclotron resonance (ECR) ion sources is in operation or under development in the world. The fourth generation ECR ion sources are expected to operate at a heating radio frequency greater than 40 GHz, requiring a higher confinement field. Such requirements provide the motivation to design the structure of the fourth generation ECR ion sources. The Nb3Sn wire, which can generate fields in the 10–20 T range, is considered to construct the magnet coils to analyze the sextupole in this study. Firstly, for both of solenoid-in-sextupole structure and sextupole-in-solenoid structure, the critical current of materials and the local magnetic field are analyzed and compared. By the comparison, sextupole-in-solenoid structure is selected to construct sextupole magnet for 56 GHz ECR ion source. Considering the characteristics of the wire, iron yoke is considered to be added around sextupole to provide a structure for the sextupole coils. Then, the confinement fields and the safety margin of the wire are analyzed and compared in the without iron yoke model and in the iron yoke model. The Lorentz force on sextupole ends w.r.t the length of sextupole is discussed. Finally, a design of sextupole with shorter iron yoke is presented in this study. With the suggested sextupole design, the length of sextupole and the total size of ECR ion source can be reduced.

Submitters Country

Korea

Primary authors: WEI, Shaoqing (Uiduk University); ZHANG, zhan (Three Gorges of University of China)

Co-author: Prof. LEE, Sangjin (Uiduk University)

Presenter: WEI, Shaoqing (Uiduk University)

Session Classification: Thu-Af-Po4.01

Track Classification: A1 - Superconducting Accelerator Magnets