



Contribution ID: 164

Type: Poster

Effects of Axial Magnetic Field in a Magnetic Multipole Line Cusp Ion Source

Experiments have been performed to study the effects of axial magnetic field on plasma and ion beam parameters in a magnetic multipole line cusp ion source. Studies performed on ring cusp and Kaufmann type ion sources suggest that the axial component of magnetic field helps in improving the ion extraction current at low discharge power. The line cusps ion sources have been used since long to produced uniform beams, however, they lack axial component of the magnetic field. These ion sources generally suffer from low efficiency possibly due the absence of axial magnetic field. In this work, an additional magnetic coil is added at various axial positions between the back-plate and the plasma grid of the multipole line cusp ion source. We have investigated the effects of axial magnetic field on the discharge efficiency and source parameters like beam current, divergence and uniformity in the multipole line cusp ion source. The beam profiles are obtained using an eleven channel faraday cup array to estimate the effects of the axial magnetic field on beam uniformity and divergence. Initial studies suggest a reduction of beam divergence with increasing axial magnetic field. A significant rise in the beam current and the discharge current is also observed when the axial magnetic field is increased. Particle trajectory simulation using the CST-Studio suite is utilised in understanding the role of confinement of primary electrons behind the improved performance of the ion source.

E-mail for contact person

bharat.rawat@ipr.res.in

Funding Information

Primary author: Mr RAWAT , Bharat Singh (Homi Bhabha National Institute and Institute for Plasma Research)

Co-authors: Dr SHARMA, S.K (Institute for Plasma Research and Homi Bhabha National Institute); Mr CHOKSI, B (Institute for Plasma Research); Mrs P, Bharathi (Institute for Plasma Research); Mr B, Sridhar (Institute for Plasma Research); Mr GUPTA, L.N. (Institute for Plasma Research); Mr THAKKAR, D (Institute for Plasma Research); Mr PARMAR, S.L. (Institute for Plasma Research); Dr V, Prahlad (Institute for Plasma Research); Mr BARUAH, U.K. (Institute for Plasma Research and ITER-India)

Presenter: Mr RAWAT , Bharat Singh (Homi Bhabha National Institute and Institute for Plasma Research)

Session Classification: Poster Session 2

Track Classification: Beam extraction, transport, and diagnostics