

PW-P014

## Experimental Research of an ECR Heating with R-wave in a Helicon Plasma Source

Ku dongjin, AN C. Y, Park Min, KIM S. H, WANG S. J

Korea Atomic Energy Research Institute

We have researched on controlling an electron temperature and a plasma collision frequency to study the effect of collisions on helicon plasmas. So, we have designed and constructed an electron cyclotron resonance (ECR) heating system in the helicon device as an auxiliary heating source. Since then, we have tried to optimize experimental designs such as a magnetic field configuration for ECR heating and 2.45GHz microwave launching system for its power transfer to the plasma effectively, and have characterized plasma parameters using a Langmuir probe.

For improving an efficiency of the ECR heating with R-wave in the helicon plasma, we would understand an effect of R-wave propagation with ECR heating in the helicon plasma, because the efficiency of ECR heating with R-wave depends on some factors such as electron temperature, electron density, and magnetic field gradient. Firstly, we calculate the effect of R-wave propagation into the ECR zone in the plasma with those factors. We modify the magnetic field configuration and this system for the effective ECR heating in the plasma. Finally, after optimizing this system, the plasma parameters such as electron temperature and electron density are characterized by a RF compensated Langmuir probe.

**Keywords:** ECR heating, R-wave, Helicon plasma