

# Microwave Electric Field and Magnetic Field Simulations of an ECR Plasma Source for Hyperthermal Neutral Beam Generation

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A 2.45 GHz electron cyclotron resonance (ECR) plasma source with a belt magnet assembly configuration (BMC) was developed for hyperthermal neutral beam (HNB) generation. A plasma source for high flux HNB generation should be satisfied with the requirements: low pressure operation, high density, and thin plasma. The ECR plasma source with BMC achieved high density at low operation pressure due to electron confinement enhancement caused by high mirror ratio and drifts in toroidal direction. The 2.45 GHz microwave launcher had a circularly bended WR340 waveguide with slits. The microwave E-field profile induced by the microwave launcher was studied in this paper. The E-field profile was a cups field perpendicular to B-field at ECR zone. The optimized E-field profile and B-field were found for effective ECR heating.

**Keywords:** ECR plasma, Microwave field simulation, Hyperthermal Neutral Beam