Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Effect of strong external magnetic field on the properties of resonance hairpin probe[1] G.S. GOGNA, Dublin City University, Ireland, S.K. KARKARI, Dublin City University, Ireland and Institute for Plasma Research, India, M.M. TURNER, Dublin City University, Ireland — The hairpin probe is a well known technique for measuring the plasma electron density. It is characterized by a sharp resonance signal at a particular frequency which depends on the plasma permittivity surrounding the resonator pins. The signal quality is found to be adversely affected due to the e-n collisions and by radiation losses in the plasma. In presence of strong magnetic field above 0.1 T, these losses are enhanced due to strong interaction with the $E \times B$ field along the magnetic flux tubes. We systematically investigated the effects of the probe orientation with respect to the external B-field on the signal quality and electron density. The results are compared with the positive ion density n_+ obtained by a slit-shaped planar Langmuir probe positioned at the end of the flux tube. At B = 0.07 T, the n_e is found to be higher as compare to n_+ due to gradient in the B-field along the flux tube which shows strong dependencies with the probe orientation. The relationship between n_e/n_+ ratio is established with the probe orientation (0-360°) which accounts for the non-uniform spatial electric field distribution around the resonator pins.

[1]The research is supported by the Enterprise Ireland Grant TD/07/335

G.S. Gogna
Dublin City University, Ireland

Date submitted: 11 Jun 2010 Electronic form version 1.4