ECRH assisted Plasma Studies on GLAST III

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Spherical tokamak is an evolutionary extension of conventional tokamak with additive advantages of low aspect ratio, low field, and tokamak confinement to achieve high beta having more resilient to disruption in a compact and more economical system. Glass Spherical Tokamak (GLAST) is a small limiter based spherical tokamak with an insulating vacuum vessel. Proposed major parameters are R= 20 cm, a= 10 cm, κ=2, I_p=50kA, B_T=0.4 T, τ_p=10ms, and T_{eo}= 400 eV. The purpose of this experiment is to understand the consumption of ohmic flux by the plasma start-up and to identify the mechanism responsible for current penetration during start-up phase of the tokamak discharge. The use of insulating vacuum vessel excites the vertical instability. This is overcome by the introduction of extra vertical coils in series with the transformer.

In this work we will present design and fabrication of Electron Cyclotron Resonance Heating (ECRH) system (2.45 GHz frequency, 1.6 KW power). Effect of ECRH power, gas pressure, and toroidal field on the plasma current will also be discussed in detail. Because of the compactness, flexibility, low operation costs, GLAST may significantly contribute to the better understanding of phenomena in a wide range of fields such as plasma confinement, plasma stability, plasma turbulence and its impact on local and global plasma parameters etc.

References:

[1] Y. K. M. Peng and D Strickler , Nuclear Fusion **26**, 769 (1986).
[2] Y. K. M. Peng, Phys. Plasmas **7**, 1681 (2000)
[3] A. Sykes, Plasma Phys. Control. Fusion **36,** B93-B106(1994)
[4] H. Bruhns, R. Brendel, G. Raupp,J. Steiger, Nucl. Fus. **27,** 2178(1987)
[5] G.A. Collins, G. Durance, G.R. Hogg, J. Tendys and P.A. Watterson, Nuclear Fusion **28,** 255(1988)
[6] P.K. Browning et al., Phys. Rev. Lett. **68,** 1722(1992)