Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Ion Beam Plasma Interactions in the ASTRAL Helicon Plasma Source. R.F. BOIVIN, A. KESTERSON, O. KAMAR, Y. LIN, J. MUNOZ, X. WANG, Physics Department, Auburn University, 206 Allison Laboratory, Auburn, AL 36849-5311 — A 100 KeV NEC duoplasmatron is used to produce an energetic ion beam (10 KeV $<$ E $<$ 100 KeV). The beam is sent through plasmas produced by the ASTRAL helicon plasma source. The beam current and beam size are measured by a device combining Retarding Field Analyzer (RFA) and Faraday Cup (FC) features. ASTRAL produces bright intense He/Ne/Ar plasmas with the following parameters: ne = 1E11 – 1E13 cm-3 and Te = 2 - 10 eV, B-field $<$ 1.3 kGauss, rf power $\leq$ 2 kWatt. RF compensated Langmuir probes are used to measure Te and ne. Depending on the ion beam energy and the ratio of beam density over plasma density different wave instabilities will be generated within the plasmas. A real-time spectrum analyzer will be used to identify the wave instabilities and their evolution in the plasma. We will present early experimental results together with some preliminary theoretical simulation using 2D and 3D hybrid simulation codes. In these codes, ions are treated as fully kinetic particles while electrons are treated as a fluid. Both species are moving in a self-consistent electromagnetic field.

Robert Boivin

Date submitted: 19 Jul 2008 Electronic form version 1.4