Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Spontaneous excitation of waves by an intense ion beam on the Large Plasma Device[1] SHREEKRISHNA TRIPATHI, BART VAN COMPERNOLLE, WALTER GEKELMAN, PATRICK PRIBYL, Department of Physics and Astronomy, UCLA, WILLIAM HEIDBRINK, Department of Physics and Astronomy, UCI — A hydrogen ion beam (15 keV, 10 A) has been injected into a large magnetized plasma ($n \approx 10^{10}$–10^{13} cm^{-3}, $T_e = 5.0$–15.0 eV, $B = 0.6$–1.8 kG, He^+ and H^+ ions, 19 m long, 0.6 m diameter) for performing fast-ion studies on the Large Plasma Device (LAPD). The beam forms a helical orbit (pitch-angle $\approx 7°$–$55°$), propagates with an Alfvénic speed (beam-speed/Alfvén-speed = 0.2–3.0), and significantly enhances the electron temperature and density when injected during the plasma afterglow. We report results on spontaneous generation of Alfvén waves and electrostatic waves in the lower-hybrid range of frequencies by the beam. Roles of normal and anomalous Doppler-shifted ion-cyclotron resonances in destabilizing the Alfvén waves were examined by measuring the phase-speed of waves and relevant parameters of the plasma using a variety of diagnostic tools (retarding-field energy analyzer, three-axis magnetic-loop, Dipole, and Langmuir probes). Conditions for the maximum growth of these waves were determined by varying the parameters of the beam and ambient plasma and examining the mode-structures in the fluctuation-spectra. Reference: Tripathi et al., Phys. Rev. E 91, 013109 (2015)

[1]Work jointly supported by US DOE and NSF and performed at the Basic Plasma Science Facility, UCLA

Shreekrishna Tripathi
Univ of California - Los Angeles

Date submitted: 15 Jul 2016 Electronic form version 1.4