Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Cherenkov radiation of Alfvén Waves by an Intense Proton Beam in a Large Magnetized Plasma[1] SHREEKRISHNA TRIPATHI, University of California, Los Angeles — Cherenkov radiation of waves by charged particles has a bearing on a number of astrophysical and terrestrial problems [1, 2]. Spontaneous radiation of traveling Alfvén waves by a short-burst of protons (5-20 keV, 2-12 A, pulse-width ≈ 8 μs, pitch-angle $\approx 0^\circ$) has been investigated on the Large Plasma Device [3]. In these experiments, the proton beam was injected into a magnetized plasma (n $\approx 10^{12}$ cm^{-3}, Te = 0.1 - 5.0 eV, B = 0.25 - 1.50 kG, H^+ ions, 19 m long, 0.6 m diameter). The beam energy was varied to explore sub- and super-Alfvénic regimes of the beam propagation (beam-speed/Alfvén-speed = 0.5 - 4.0) for inertial and kinetic Alfvén waves. The interaction of the beam with the plasma was diagnosed using a retarding-field energy analyzer, three-axis magnetic-loop, and Langmuir probes. Cherenkov radiation of Alfvén waves is observed when the beam-speed exceeds the Alfvén speed. In this regime, the wave forms a conical pattern and lags behind the super-Alfvénic proton-burst. References: (1) Krechetov, Geomagnetism and Aeronomy, 35(5), 688 (1995); (2) Van Compernolle et. al., Phys. Plasmas 15, 082101 (2008); (3) 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

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Date submitted: 02 Jul 2019 Electronic form version 1.4