Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Towards an understanding of flows in avalanche transport phenomena[1] SUYING JIN, NIKOLAS RAMADAN, BART VAN COMPERNOLLE, MATT J. POULOS, GEORGE J. MORALES, Univ of California - Los Angeles — Recent heat transport experiments[1] conducted in the Large Plasma Device (LAPD) at UCLA, studying avalanche phenomena at steep cross-magnetic field pressure gradients, suggest that flows play a critical role in the evolution of transport phenomena, motivating further characterization. A ring shaped electron beam source injects sub-ionization energy electrons along the strong background magnetic field within a larger quiescent plasma, creating a hollow, high pressure filament. Two distinct regimes are observed as the density decays; the first characterized by multiple small avalanches producing sudden relaxations of the pressure profile which then recovers under continued heating, and the second signaled by a permanent collapse of the density profile after a global avalanche event, then dominated by drift-Alfven waves. The source is modified from previous experiments to gain active control of the flows by controlling the bias between the emitting ring and surrounding carbon masks. The results of flow measurements obtained using a Mach probe and Langmuir/emissive probe are here presented and compared. An analytical model for the behavior of the electron beam source is also in development.
[1] B. Van Compernolle et al. Phys Rev. E 91, 031102 (2015)

[1]Sponsored by NSF grant 1619505 and by DOE/NSF at BaPSF

Suying Jin
Univ of California - Los Angeles

Date submitted: 14 Jul 2017 Electronic form version 1.4