

Abstract Submitted  
for the DPP19 Meeting of  
The American Physical Society

**Experimental observation of drift wave turbulence in an inhomogeneous cusp magnetic field of MPD** AMITKUMAR PATEL, NARAYAN RAMASUBRAMANIAN, Institute for Plasma Research — This paper presents a detailed study on the controlled experimental observation of drift wave instabilities in an inhomogeneous Six pole cusp magnetic field generated by an in-house developed Multi-pole line cusp magnetic field device (MPD) [Patel *et al.* Rev. Sci. Instrum., **44**, 726 (2018)]. The device is composed of six axially symmetric cusps and non-cusp (in between two consecutive magnets) regions. The observed instability has been investigated in one of these non-cusp regions by controlling the radial plasma density gradient with changing pole magnetic field which is a unique feature of this device. It has been observed that the frequency of the instability changes explicitly with the density gradient. Moreover the scale length of plasma parameters, frequency spectrum, cross-correlation function, and fluctuation level of plasma densities has been measured in order to identify the instability. The cross field drift velocity due to fluctuation in plasma parameters have been measured from the wave number-frequency  $S(k_z, \omega)$  spectrum and verified with the theoretical values obtained from density scale length formula. .

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Date submitted: 03 Jul 2019

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