Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Localized electron heating and downstream density rise in expanding helicon plasma SOUMEN GHOSH, KSHITISH BARADA, PRABAL CHATTOPADHYAY, JOYDEEP GHOSH, DHIRAJ BORA, Institute for Plasma Research, Bhat, Gandhinagar-382428, India — Localized electron heating and downstream density rise have been observed in presence of diverging magnetic fields in a linear expanding helicon plasma system. Axial wave field measurement shows the presence of damped helicon waves with standing wave character folded into it even at low densities (10^{16} m^{-3}). Helicon wavelength is just about twice the antenna length and the phase velocity (v_p) is almost equal to the speed required for electron impact ionization. Observations advocate the Landau damping heating by the helicon waves, particularly in our low density plasma. Electron heating, confined away from the antenna centre, strongly indicates a source of local power absorption, occurring due to damped helicon waves [1]. Further downstream from the location of electron heating, a density peak is observed. Location of both electron heating and density peaking can be varied by changing the axial magnetic field topology. A comprehensive discussion regarding the cause behind both the localized electron heating and downstream density rise will be discussed in this presentation.

[1] Soumen Ghosh, K. K. Barada, P. K. Chattopadhyay, J. Ghosh, and D. Bora. Plasma Sources Sci. Technol. 24, 034011, (2015).

Soumen Ghosh
Institute for Plasma Research, Bhat, Gandhinagar-382428, India

Date submitted: 23 Jul 2015 Electronic form version 1.4