R008-08
Zoom meeting D ：11/3 AM2 (10:45-12:30)
11:30-11:45

Dynamic profile formation in the high-density helicon plasma

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Helicon plasma is one of the Radio Frequency (RF) plasma sources that can generate high-density (number density 10^{19} m^{-3}) and low-temperature (electron temperature from a few eV to several eV) plasmas by utilizing the helicon wave, i.e., the electromagnetic whistler wave in a bounded geometry [1-3]. The helicon plasma is thought to be useful for various applications including plasma processing, nuclear fusion, and electric thrusters [4].
The helicon plasma production involves various processes such as the wave excitation (the RF antenna - plasma coupling), the wave propagation (dispersion relation), collisional or non-collisional wave damping and plasma heating, ionization of neutral particles, and flux transport of the plasma. Besides these fundamental physical issues, the effects of neutral dynamics on the plasma transport and the maximum plasma density are shown to be significant by experimental as well as theoretical studies.
In our study, we have constructed the self-consistent fluid model including the neutral dynamics. By using this model, we have certified several important temporal behaviors of the power absorption [5], the flux balance [5], density jumps [6] and the neutral dynamics [6] in the high-density helicon plasma, which are consistent with the experimental results [7]. In our presentation, we will discuss the dynamic behaviors of helicon discharge in detail including the effect of the neutral dynamics.

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