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Progress of linear plasma device LEAD in SWIP

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LEAD (Linear Experimental Advanced Device) is a newly built linear plasma device in SWIP (Southwestern Institute of Physics) in Chengdu, China. The device has achieved its first plasma in March 2018. The device has a two-stage vacuum chamber, with diameters of 400mm and 900mm, respectively. The magnetic system consisting of 15 conventional magnets generate a adjustable magnetic field with a max strength of 0.2T. The plasma is generated by a 5KW, 13.56MHz helicon plasma source with a large diameter multi-ring antenna. The main goal of LEAD is to study edge turbulence characteristics and plasma material interaction.

Since LEAD get the first plasma, progress in various aspects has been achieved. The most important is the successful development of a large-diameter multi-ring antenna helicon plasma source, which has a unique antenna design and showed high energy coupling efficiency in plasma generation. Some basic parameters of the helicon plasma are measured by Lanmiur probes.

About diagnostics, a multi-channel azimuthal magnetic probe array system and a fast camera visible light imaging system is developed for LEAD. Also, an azimuthal radially-movable Langmiur probe array and a Laser-induced fluorescence diagnostic system is in development.

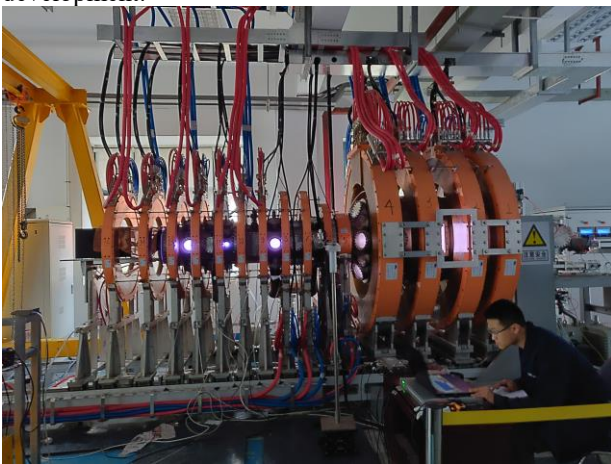


Fig.1 The LEAD device in helicon-mode discharge

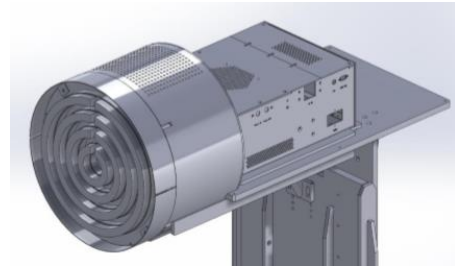


Fig. 2 Helicon plasma source

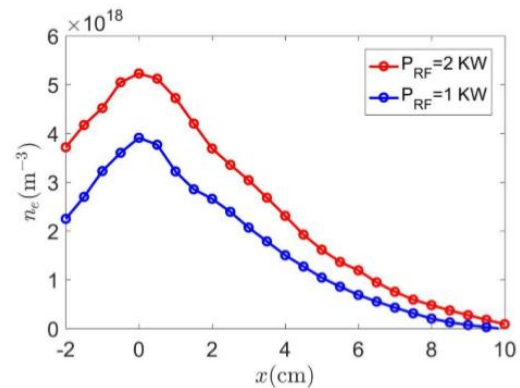


Fig. 3 Plasma density profile



Fig. 4 Magnetic probe array

References

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