

## **Analysis of supersonic plasma flow under the influence of impurity with gridded-bias in DiPS-2**

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Plasma flow has been an important factor to understand the formation of presheath and sheath in edge plasma region in term of transition from the subsonic to the supersonic by satisfying of Bohm criterion [1]. However, this plasma flow would be influenced by dusts and vapor which were generated by high transient heat loads such as edge localized modes (ELMs) and plasma-wall interaction in plasma edge. These dusts and vapor have slower velocity than plasma flow [2], which generates the necessity of analysing plasma flow with impurities. We generated helium plasma in a linear machine, called Divertor Plasma Simulator – 2 (DiPS - 2), which generates plasma using LaB<sub>6</sub>. DiPS – 2 has the following specification and plasma parameter : B-field = 1 - 3 kG, working pressure ~ 0.1 mTorr,  $I_{dis} = 1 - 50A$ ,  $n_e \sim 10^{10} - 10^{11} \text{ cm}^{-3}$ ,  $T_e \sim 1 - 25 \text{ eV}$  for He plasmas). Plasma flow velocity was measured according to injecting impurities (Dust, Ar and N<sub>2</sub>) in helium background plasmas. Ions were accelerated by grid system (from -100 V to 0 V) in order to generate supersonic plasma. Plasma flow velocity was analysed using various kinetic model and fluid model. A kinetic model is to be applied to analyze the experimental results.

### References:

- [1] Ph Ghendrih et al, Plasma Phys. Control. Fusion 53 (2011) 054019.
- [2] A.A. Shoshin et al, Fusion Eng. Des. 114 (2017) 157.