Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

The Effect of External Driven Sources on the Edge Radial Electric Field GUOLIANG XIAO, Southwestern Insititute of Physics, Chengdu, China — Intensive work has been conducted to investigate the role of EB flow shearing for L-H transition. It has been shown that this flow shear is responsible for the turbulence suppression. An effective method to achieve the external active control of EB velocity shear is required to accelerate the transition process. Recently, a body of work has pointed out that the turbulence regulation by shear flow also play an important role during ELM mitigation. At present, active control techniques for the radial electric profile is the electrode immersed in the device or the outer magnetic perturbation coils. In the HL-2A H mode plasma, different methods have been found to modify the radial electric profile, namely, EB velocity shear, such as SMBI, LBO impurity seeding and LHCD. This paper reports the obvious modification and different effects of these external source input on the EB velocity shear. And the discrepancy is due to the external source input modified the different term of the EB velocity shear. LHCD modified the ion diamagnetic term $\nabla \mathrm{E}_r^{\nabla P_i}$ of the $\gamma_{E\mathrm{B}}$ due to the non-resonant collisional absorption of the high $\mathrm{N}_{//}$ components of lower hybrid wave at the plasma edge. On the other hand, different from the experiment with LHCD, it has been observed that change of $\gamma_{E\mathrm{B}}$ with LBO impurity seeding and SMBI is attributed to the poloidal velocity component $\nabla \mathrm{E}_\mathrm{r}^{\mathrm{V}_\theta}$ and the toroidal velocity component $\nabla \mathrm{E}_\mathrm{r}^{\mathrm{V}_\varphi} \nabla \mathrm{E}_\mathrm{r}^{\mathrm{V}_\theta}$ due to the localized cooling effect. These results indicate that the edge flow shear can be regulated to achieve L-H transition and ELM mitigation by alternating proper external source input.

Guoliang XIAO
Southwestern Insititute of Physics, Chengdu, China

Date submitted: 03 Jul 2019 Electronic form version 1.4