

Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Current driven by electromagnetic ETG turbulence WEN HE, LU WANG, SHUITAO PENG, Huazhong University of Science Technology — Recently, there has been intensive investigation of turbulence induced spontaneous rotation in tokamak. Naturally, current driven by turbulence has also been considered such as the electron temperature gradient (ETG) instability with a fluid mode [1]. The electrostatic gyrokinetic simulation [2] shows that the ETG turbulence driven current density corresponds to 20% of the local bootstrap current density. In this paper, the quasilinear version of the current evolution equation in the presence of electromagnetic (EM) ETG turbulence is presented using EM gyrokinetic equation. There are two types of current driving mechanisms. The first type is the divergence of stress, while the second type is called turbulent acceleration source. Finally, we compare the turbulent driven current to the background bootstrap current. The results demonstrate that the EM effect is important for the turbulent driven current. And the source term contributes a little to the total current. The modification of the current due to EM ETG turbulence is not dramatic in today's tokamak. However, it may play a significant role in future device.

[1] Tiwari S. et al., IAEA (2014)

[2] Yi S. et al., Phys. Plasmas, 23, 102514 (2016)

Wen He
Huazhong University of Science
Technology

Date submitted: 19 Jul 2017

Electronic form version 1.4