

Abstract Submitted  
for the DPP16 Meeting of  
The American Physical Society

**Marker loading effect on ion-temperature-gradient turbulence**

HONGWEI YANG, YONG XIAO, Institute for fusion theory and simulation, Zhejiang university, Hangzhou 310027, China, ZHIHONG LIN, University of California, Irvine, CA — Generally, a limited number of particles called “markers” are used to simulate a physical system in the particle simulation for plasmas. In this work we find for the first time that different marker particle loading methods would introduce different physical consequences to the global gyrokinetic simulations. The well-studied ion temperature gradient (ITG) turbulence has been chosen to check the results that are carried out by the GTC code from three different particle loading methods in the electrostatic limit: uniform loading, nonuniform temperature and uniform density loading, and nonuniform loading. When applying these three loading methods in GTC code to study the same ITG case, the results from the uniform is very different to the other two methods. Our further study shows that this difference could be contributed by the finite Larmor radius (FLR) effect. The results also suggest that the implementation of global particle equilibrium may play important role on these differences. In addition, this result indicates that such difference among different loading methods may have an important effect on the size scaling of the turbulent transport.

**Keywords:** particle loading, ion temperature gradient mode, finite Larmor radius effect

Hongwei Yang  
Institute for fusion theory and simulation, Zhejiang university, Hangzhou 310027, China

Date submitted: 20 Jul 2016

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