中科院等离子体所研究员讲堂

研究员讲堂第 120 期

报告题目：Extended neoclassical rotation and transport study

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主持人：吕波　研究员

时间：2021 年 11 月 12 日（周五）下午 14：00

地点：EAST 控制大厅三楼会议室

摘要 ：

An extended neoclassical rotation theory [Bae et. el., Nucl. Fusion 53 (2013) 043011] and its code GTROTA [Bae et l., Comp. Phys. Comm. 184 (2013)], based on Braginskii's closure with realistic D-shaped Miller flux surface geometry [Miller et. al., Phys. of Plasmas, 5 (1998)], have been used to analyze discharges from DIII-D, KSTAR, and EAST. The code successfully calculates measured carbon rotation velocities within a reasonable accuracy and self-consistently predicts unmeasured velocities and other transport properties. In particular, main features of the theory and code allow us to calculate the first-order poloidal asymmetries in density, velocity, and electrostatic potential that are observed in modern tokamak experiments. Extension of the theory and consequent code upgrades in the near future are expected to increase the accuracy of rotation and transport properties in the plasma edge and in non-axisymmetric tokamak plasmas.

This presentation introduces the main features of the current and future theoretical and computational models with examples from the analyzed discharges [Bae et. al., Phys. of Plasmas, 21 (2014)].

授课人介绍：

Cheonho Bae 博士毕业于佐治亚理工学院核工程专业，主要研究方向集中在发展一种扩展型的新经典等离子体旋转理论。该理论考虑了等离子体非圆截面位型和等离子体密度和速度在磁面上的上下和内外不对称性，也包括了各种非线性粘滞项，发展了 GTROTA 旋转分析程序，可以计算杂质离子和主离子的极向和环向速度分布，并在 DIII-D 和 KSTAR 上的 NBI 加热 H 模等离子体实验中得到验证。该程序正在进一步发展，以进一步应用于射频波加热等离子体自发旋转的模拟研究，对于可靠预测未来聚变堆旋转特性有重要作用。Bae 博士在 Nuclear Fusion 等国际聚变权威期刊上发表论文数篇，其开发的程序也在 KSTAR 和 DIII-D 等主要托卡马克上进行了应用，并计划在 EAST 上开展合作研究。