

数学与系统科学研究院

计算数学所学术报告

报告人: **Dr. Bei Wang**

(*PIC3icE, Princeton University*)

报告题目:

**Recent Advances in Gyrokinetic
Particle-in-Cell Method for Long
Time Simulations of ITER-size
Plasmas**

邀请人: 崔涛 博士

报告时间: **2013 年 10 月 11 日 (周五)**

上午 10:00-11:00

报告地点: 科技综合楼三层 **301**

计算数学所小报告厅

Abstract:

High-physics-fidelity predictive simulation capability is crucial to understand the confinement properties of magnetically confinement plasmas, e.g., ITER. While the gyrokinetic PIC method has been well established to study low-frequency turbulence, significant challenges remain, e.g., numerical noise issue for long time simulation, computational cost for high fidelity simulation. In this talk, we will present the algorithm and software advances in the modern GyrokineticToroidal Code, GTC-P, addressing noise issue and the scalability of the code on high-end computing platforms. We present our latest results in simulating long-time evolution of Ion-Temperature-Gradient (ITG)-driven plasma turbulence on Mira, the third generation BG/Q system at Argonne National Laboratory. This highly efficient code has achieved a 5x performance enhancement compared with the previous version and clearly demonstrates that advanced mathematical algorithm and high performance computing can lead to a significant return in solving a complex problem.

Bio:

Bei Wang is currently a Postdoctoral Research Associate at Princeton University, funded by the G8 Research Councils Initiative on Multilateral Research Funding. She received her BSc degree from Southwest Jiaotong University, Chengdu, China in 2003 and her MSc and PhD degrees from University of California at Davis in 2004 and 2011, respectively. Her current research interests include advanced algorithm and large-scale software development for complex PDEs in fluid dynamics and plasma physics, with a special focus on gyrokinetic PIC simulations of microturbulence in magnetic confinement plasmas.

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