数学与系统科学研究院

计算数学所学术报告

报告人： **Prof. Leonid E. Zakharov**

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报告题目：

Introduction to the Tokamak Magneto-Hydrodynamics (TMHD) (part 1)

邀请人： 郑伟英 研究员

报告时间：2014 年 12 月 13 日（周六）

下午 **15:00-16:00**

报告地点： 数学院南楼七层 **702**

会议室

Abstract：

The topic of the talk is motivated by needs in understanding and simulating the so called disruptive instability in tokamaks, which are the leading devices for developing fusion energy.

A new MHD model, specific for simulations of macroscopic plasma dynamics in tokamaks, is presented and called TMHD.

The talk explains the simplest set of magneto-hydrodynamics equations of TMHD sufficient for disruption modeling.

First, the TMHD introduces to 3-dimensional simulations the Reference Magnetic Coordinates (RMC), which are aligned with the magnetic field in the best possible way.

The numerical implementation of RMC is adaptive grids. Being consistent with the high anisotropy of the tokamak plasma, RMC allow simulations at realistic, very high plasma electric conductivity.

Second, the TMHD splits the equation of motion into an equilibrium equation and the plasma advancing equation. This resolves the 4 decade old problem of Courant limitations of the time step in numerical plasma simulations.

Third, TMHD is consistent with the needs in taking into account the complicated structure of the plasma facing wall surface in disruption simulations.

欢迎大家参加！