

数学与系统科学研究院

计算数学所学术报告

报告人: **Prof. Jitse Niesen**

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报告题目:

**Preserving Taylor's constraint in
magnetohydrodynamics**

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报告时间: **2015 年 4 月 1 日 (周三)**

下午 16:00-17:00

报告地点: **数学院科技综合楼**

三层 311 报告厅

Abstract:

The Earth's magnetic field is generated in the outer core, whose behaviour is described by a combination of the Navier-Stokes equation and the Maxwell equation. A problem when solving these equation is that a certain number, the Ekman number, is very small: around 10^{-16} . Usually, people use big computers to solve the equations, but even then the Ekman number in the simulations can only be taken to be 10^{-6} . The alternative is to take the Ekman number equal to zero. This corresponds to a singular limit, in which the equations degenerate into a partial differential algebraic system. Taylor's constraint is an infinite number of quadratic conserved quantities in this limit and it is thought that this constraint causes instabilities in earlier attempts to solve the equations. I will describe our on-going efforts to design and implement a numerical method for solving the equations which preserves Taylor's constraint, making it hopefully stable.

欢迎大家参加！