

数学与系统科学研究院

计算数学所学术报告

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报告题目:

**Modeling and Analysis of Bio-
suspensions**

邀请人: 明平兵研究员

报告时间: 2009年6月11日(周四)

下午 4:00—5:00

报告地点: 科技综合楼三层 301

计算数学所报告厅

Abstract:

We discuss the transition from the well developed modeling and analysis of passive suspensions to active suspensions (namely, bio-suspensions) in fluids. Modeling of bacterial suspensions and, more generally, of suspensions of active microparticles has recently become an increasingly active area of research. The focus of our work is on the development and analysis of a mathematical PDE model for the multiscale problem of bacterial suspensions. We discuss recent results on the effective viscosity of dilute bacterial suspensions (with Aronson, Haines and Karpeev). Explicit formulas are obtained for the effective viscosity of such suspensions in the limit of small concentrations. These formulas includes the two terms that are found in the Einsteins classical result for passive suspensions. To this, the main result of this work is added—an additional term due to self-propulsion (including stochastic tumbling)

which depends on the physical and geometric properties of the active suspension. This term explains the experimental observation of a decrease in effective viscosity in active suspensions. If time permits we will discuss recent results on asymptotic analysis of the swimming patterns of bacteria in non-dilute suspensions (with Aronson, Gyrya and Karpeev).

欢迎大家参加！