

数学与系统科学研究院

计算数学所学术报告

报告人: **Dr. Shuonan Wu**

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报告题目:

**Multiphase Allen-Cahn and
Cahn-Hilliard Models and Their
Discretizations**

邀请人: 邸亚娜 副研究员

报告时间: 2015 年 12 月 25 日(周五)

下午 14:00~15:00

报告地点: 数学院南楼七层

702 会议室

Abstract:

In this talk, we study the mathematical properties and numerical discretizations for the N-phase system simulating the phase separation of N-component mixture. For the general choice of phase variables, the unisolvent property of mixing energy density coefficient matrix involved in the N-phase model based on the pairwise surface tensions is presented. Moreover, the symmetric positive definite property of coefficient matrix on a $(N - 1)$ -dimensional hyperplane, which is fundamentally important for the well-posedness of the model, can be proved equivalent to the some physical condition for pairwise surface tensions. The Allen-Cahn and Cahn-Hilliard equations can then be derived from the mixing energy functional. An interesting property is that the resulting dynamics of concentrations are independent of the choice of phase variables. Finite element discretizations for N-phase models can be obtained as the natural extension of the existing discretizations for two-phase model. The energy dispersion of numerical solutions can be proved and numerically observed under some restrictions of time step size. We also describe numerical experiments such as the evolution of triple junctions and the spinodal decomposition in a quaternary mixture to investigate the effect of pairwise surface tensions.

欢迎大家参加！