Schedule of the 2025 Workshop on PDE

Time: Nov 27, 2025 (Morning)

Venue: Room 401, Math Building, Minhang Campus, ECNU

Time	Speaker	Presentation Title	Chair
8:20-9:20	Philippe Laurençot	Nonlocal and reversible approximations of the Gray-Scott model	Dong Ye 叶东
9:20-9:35	Tea Time		
9:35-10:35	Jie Jiang 江杰	On a Keller-Segel Chemotaxis Model with Signal-dependent Motility	Feng Zhou 周风
10:35-11:35	Hao Wu 吴昊	The Cahn-Hilliard equation with dynamic boundary conditions and singular potentials	Yanyan Zhang 张艳艳

Abstract

Nonlocal and reversible approximations of the Gray-Scott model

Philippe Laurençot

Abstract: The Gray-Scott model is a system of two reaction-diffusion equations with mass balance which may generate a wide variety of spatial patterns. Two variants of this model are considered in this talk. In the first one, the Laplace operators are replaced by nonlocal operators with integrable kernels and well-posedness of the corresponding model is shown, along with the convergence of its solutions to the classical Gray-Scott model in the diffusive limit. In the second one, the original system is completed by additional reaction terms and two additional equations to make it ``reversible'' in [Liang, Jiang, Liu, Wang & Zhang,2022] and the well-posedness and long term dynamics of the resulting system are investigated. Convergence to the classical Gray-Scott model is also shown. (joint works with Christoph Walker, Leibniz Universität Hannover, Germany)

报告人介绍：Philippe Laurencot 教授现就职于法国萨瓦大学 LAMA 数学研究所，是法国 CNRS 高级研究员。他是国际知名的偏微分方程专家，在非线性椭圆型和非线性抛物型方程研究领域均做出了很多重要工作，研究方向包括凝血-碎裂方程、MEMS（微机电）方程、

Hamilton-Jacobi 方程、流体力学方程、生物趋化方程、相场方程等。Laurencot 教授在上述研究领域发表论文 200 余篇，引用 2700 余次（zbmath.org）。关于凝血-破裂模型与他人合作出版学术专著一部（两卷）。Laurencot 教授担任多个数学期刊的编委，如 Journal of Evolution Equations（2018-），Annales de la Faculte des Sciencesde Toulouse (2015 – 2019), Nonlinear Analysis : Real World Applications (2012 – 2022) 及 Applications of Mathematics-Praha (2002–)等。

On a Keller-Segel Chemotaxis Model with Signal-dependent Motility

Jie Jiang（江杰）

Abstract: We report our recent work on analysis of a chemotaxis PDE model involving signal-dependent motility, which was originally proposed by Keller and Segel in their seminal work in 1971.

The system features a signal-dependent motility function (diffusion rate), which may vanish or explode as the signal concentration becomes unbounded. We develop systematic new methods to study its global well-posedness and qualitative behavior of classical solutions. The key idea consists of an introduction of several auxiliary functions satisfying elliptic/parabolic problems, together with delicate applications of various comparison skills.

The talk is based on my recent joint works with Kentaro Fujie (Tohoku University), Philippe Laurençot (University of Savoie Mont Blanc & CNRS), Yanyan Zhang (ECNU), and Yamin Xiao (HEBTU), respectively.

报告人介绍：江杰，中国科学院精密测量科学与技术创新研究院，研究员。主要研究趋化方程、相场-流体方程等非线性方程整体解的存在唯一性、有界性、渐近性以及无穷维动力系统的性质等问题。主持国家自然科学基金面上项目、青年基金、湖北省自然科学基金面上项目等课题。

The Cahn-Hilliard equation with dynamic boundary conditions and singular potentials

Hao Wu（吴昊）

Abstract: In this talk, we present recent progress in the study of a class of Cahn-Hilliard equations with dynamic boundary conditions, which model short-range interactions between a binary mixture and a solid boundary. For the initial boundary value problem with physically relevant singular potentials, we address the following aspects: (1) well-posedness, (2) regularity and the separation property of solutions, (3) long-time behavior, (4) asymptotic limits concerning the boundary diffusion coefficient and the kinetic rate.

报告人介绍：吴昊教授，复旦大学数学科学学院教授、博士生导师，2003 年本科毕业于复

旦大学获理学学士学位，2007 年研究生毕业于复旦大学获理学博士学位。主要研究方向为非线性发展方程的适定性及其整体解的长时间行为，他在相场动力学方程、液晶流体力学方程等领域取得了一系列进展，研究成果发表于 ARMA， Math. Ann., SIAM J. Math. Anal., M3AS, JFA, CVPDE, Ann. Inst. H. Poincaré Anal. NonLinéaire 等数学专业期刊。曾获 2015 年中国工业与应用数学学会优秀青年学者奖，入选 2016 年度上海市青年拔尖人才以及教育部 2019 年度“长江学者奖励计划”青年学者。现担任 Adv. Differ. Equations 等学术期刊的编委。