2016 Special Month on Partial Differential Equations
June 1st --- June 30th , 2016

Objective

The program of 2016 PDE special month is aiming to provide a platform for researchers to communicate the latest progress in partial differential equations and their applications.

Organizers

Yachun Li

Weike Wang

Ya-Guang Wang

Shijin Deng

Beixiang Fang

Qilong Gu

Chunjing Xie

Feng Xie

Xiongfeng Yang

Activities

- **Zhang, Liqun, Academy of Mathematics and System Sciences, Chinese Academy of Sciences**

  2016-06-01, 16:00-17:00; Large Conference Room, Math Building

  Title: Continuous Weak Solutions Of Boussinesq Equations 【colloquium】
  Abstract:
  The Boussingesq equations was introduced in understanding the coupling nature of the thermodynamics and the fluid dynamics. We prove the existence of continuous periodic weak solutions of the Boussinesq equations which either satisfies the prescribed kinetic energy or some other property. This is a jointed work with Tao tao.

- **Han, Qing, Department of Mathematics, University of Notre Dame, USA**

  2016-06-02, 16:00-17:00; Middle Conference Room, Math Building

  Title:　Singular solutions of the Yamabe equation

  Abstract:

  　　In a classical paper, Cafferelli, Gidas and Spruck discussed positive solutions of the Yamabe equation, corresponding to the positive scalar curvature of the conformal metrics, with a nonremovable isolated singularity. They proved that solutions are asymptotic to radial singular solutions. Korevaar, Mazzeo, Pacard, and Schoen expanded solutions to the next order. In this talk, we discuss how to expand solutions up to arbitrary order.

- **Peng, Yue-Jun, Laboratoire de Math'ematiques, Universit'e Blaise Pascal, France**

  2016-06-03, 10:00-11:00; Middle Conference Room, Math Building

  Title: Global quasi-neutral limits of Euler-Maxwell systems

  Abstract:

  　　We consider smooth solutions to the Cauchy problem for an isentropic Euler-Maxwell system with small physical parameters. For initial data uniformly close to constant equilibrium states, we prove the global-in-time convergence of the system as the parameters go to zero. The limit systems are the e-MHD system or the incompressible Euler equations. The proof of the results relies on a single uniform energy estimate with respect to the time and the parameters, together with compactness arguments. For this purpose, the classical energy estimates for the symmetrizable hyperbolic system are not sufficient. We construct a Lyapunov type energy by controlling the divergence and rotation of the velocity, the electric and magnetic fields.

- **He, Xiao, Dalian Minzu University**

  2016-06-06, 16:00-17:00; Middle Conference Room, Math Building

  Title:　Global boundedness in quasilinear attraction-repulsion chemotaxis system with logistic source

  Abstract:

  　　We study the quasilinear attraction-repulsion chemotaxis system with logistic source in bounded domain, subject to the homogeneous Neumann boundary conditions. If the attraction is dominated by one of the other three mechanisms, then the solutions are globally bounded. Under more interesting balance situations, the behavior of solutions depends on the coefficients involved. Three balance situations (attraction-repulsion balance, attraction-logistic source balance, and attraction-repulsion-logistic source balance) are considered to establish the boundedness of solutions for the parabolic-elliptic-elliptic case (with $\tau = 0$) and the parabolic-parabolic-elliptic case respectively.

- **Wang, Yanjin, Xiamen University**

  2016-06-07, 10:00-11:00; Middle Conference Room, Math Building

  Title: The Vlasov–Poisson–Landau system in R3
  Abstract:
     Consider the two-species Vlasov–Possion–Landau system near Maxwellians in the whole space. It is shown that the cancelation between two species and its coupling with the electric field yield the faster time decay of the system, which leads to our construction of global classical solutions without low frequency assumptions.

- **Xiang, Wei, City University of Hong Kong**

  2016-06-09, 10:00-11:00; Middle Conference Room, Math Building

  Title: Convexity of transonic shock in the self-similar coordinates and the applications
  Abstract:
     Convexity of shocks is frequently observed in many experimental results and provides better understanding of mathematical problems with the nonlinear wave, the uniqueness for instance. We consider the pseudo-transonic shock governed by the potential flow equation in the self-similar coordinates, and give a framework to show the strict and uniform convexity by a nonlinear and global argument. Finally, several applications are given.

- **Symposium on Nonlinear Partial Differential Equations and Applications**

  2016-06-10; Large Conference Room, Math Building

Program

13:25-13:30		**Opening Remarks**
13:30-14:20	**Deng, Yinbin**	**Solitary wave solutions to a quasilinear Schrödinger equation**
14:20-15:10	**Liu, Zuhan**	**TBA**
15:10-15:30		**Coffee/Tea Break**
15:30-16:20	**Wang, Xiao-Ping**	**A dynamic theory for the speed dependent contact angle hysteresis**
16:20-17:10	**Li, Hailiang**	**Spectrum structure and behaviors of kinetic equations**

17:10-17:30	**Free Discussion**

- Deng, Yinbin, Central China Normal University

  Title: Solitary wave solutions to a quasilinear Schrödinger equation
  Abstract:
  This talk is concerned with a quasilinear Schrödinger equation in R^N involving critical expo-nents, which models the self-channeling of a high-power ultra short laser in matter. We obtain an existence result on its solitary wave solutions by using a change of variables, variational argument and a Pohozaev type identity.

- Liu, Zuhan, Yangzhou University

  Title: TBA
  Abstract:
  TBA

- Wang, Xiao-Ping, The Hong Kong University of Science and Technology

  Title: A dynamic theory for the speed dependent contact angle hysteresis
  Abstract:
  We study the interface dynamics and contact angle hysteresis in a two dimensional, chemically patterned channel described by the Cahn-Hilliard equation with a relaxation boundary condition. A system for the dynamics of the contact angle and contact point is derived in the sharp interface limit. From the behaviour of the solution of the contact angle dynamic equation, we observe stick-slip motion and contact angle hysteresis. Our analysis reveals the mechanism for the asymmetric speed dependent contact angle hysteresis observed experimentally. We also develop an efficient volume-preserving threshold-dynamics method for the wetting dynamics. Numerical examples are presented to verify our analysis.

- Li, Hai-Liang, Capital Normal University

  Title: Spectrum structure and behaviors of kinetic equations
  Abstract:
  We present the recent results on the spectrum structures of the Vlasov-Poisson(Maxwell)-Boltzmann equations and justify the influences of the electrostatic potential force, Lorentz force, and/or the mutual interaction between charged particles of differernt types. It is joint work with Ying Wang, Mingying Zhong and Tong Yang.

- **Nedeljkov, Marko, University of Novi Sad**

  Visit SJTU from June 11 to June 27.

Title: TBA

Abstract:

TBA