应用中的偏微分方程线上研讨会

会议日程

上海国家应用数学中心、复旦大学数学科学学院

11 月 25 日（周四）	**腾讯会议号：377 872 292 密码：200433**	
9:00—9:05	**自由讨论**	
9:05—10:05	报告人： 赖宁安 教授（丽水学院） 标题：Blow-up and lifespan estimate to a nonlinear wave equation in Schwarzschild spacetime	主持人：王焰金（厦门大学）
10:05—11:05	报告人： 刘存明 教授（曲阜师范大学） 标 题：Global quasi-neutral limit for a two-fluid Euler-Poisson system	
11:05—12:00	**咨询与讨论**	

11 月 27 日（周六）	**腾讯会议号：252 870 848 密码：200433**	
9:00—9:05	**自由讨论**	
9:05—10:05	报告人：刘海蓉 教授（南京林业大学） 标题：Global solutions to compressible fluid dynamics equations on exterior domains	主持人：曲鹏（复旦大学）
10:05—11:05	报告人：程建峰 教授（四川大学） 标题：The well-posedness of axially symmetric compressible subsonic jet impinging flow	
11:05—12:00	**咨询与讨论**	

会议组织：曲鹏、蔡圆

报告摘要

报告人： 赖宁安 教授（丽水学院）

标题：Blow-up and lifespan estimate to a nonlinear wave equation in Schwarzschild spacetime

摘要：We study the semilinear wave equation with power type nonlinearity and small initial data in Schwarzschild spacetime. If the nonlinear exponent p satisfies $2\le p\le1+\sqrt 2$, we establish the blow-up result and lifespan estimate. The key novelty is that the compact support of the initial data can be close to the event horizon. By combining the global existence result for $p>1+\sqrt 2$ obtained by Lindblad et al.(Math. Ann. 2014), we then give a positive answer to the interesting question posed by Dafermos and Rodnianski(J. Math. Pures Appl. 2005, the end of the first paragraph in page 1151): $p=1+\sqrt 2$ is exactly the critical power of p separating stability and blow-up. This is a joint work with Prof. Yi Zhou.

报告人： 刘存明 教授（曲阜师范大学）

标题：Global quasi-neutral limit for a two-fluid Euler-Poisson system

摘要：The quasi-neutral limit of one-fluid Euler-Poisson systems leads to incompressible Euler equations. It was widely studied in previous works. Here, we deal with the quasi-neutral limit in a two-fluid Euler-Poisson system. This limit presents a different feature since it leads to compressible Euler equations. We justify this limit for global smooth solutions near constant equilibrium states in one space dimension. Specifically, we prove a global existence of smooth solutions by establishing uniform energy estimates with respect to the Debye length and the time. This allows to pass to the limit in the system for all time. Moreover, we establish global error estimates between the solution of the two-fluid Euler-Poisson system and that of the compressible Euler equations. The proof is based on classical uniform energy estimates together with various dissipation estimates. In order to control the quasi-neutrality of the velocities of two-fluids, similar conditions on the initial data are needed. This is a joint work with Prof. Yue-Jun. Peng.

报告人： 刘海蓉 教授（南京林业大学）

标题：Global solutions to compressible fluid dynamics equations on exterior domains

摘要：In this talk, we will introduce some results about the initial boundary value problems for compressible Navier-Stokes-Poisson/MHD equations on exterior domains in R^3. The global existence of smooth solutions near a given constant steady state for compressible Navier-Stokes-Poisson equations on an exterior domain in R^3 with physical boundary conditions is established with the exponential stability. Furthermore, the global existence of smooth solutions and the explicit decay rate for compressible MHD with the boundary conditions of Navier-slip for the velocity filed and perfect conduction for the magnetic field is established.

报告人： 程建峰 教授（四川大学）

标题：The well-posedness of axially symmetric compressible subsonic jet impinging flow

摘要：This talk is concerned with the well-posedness theory of the impact of a subsonic axially symmetric jet emerging from a semi-infinitely long nozzle, onto a rigid wall. The fluid motion is described by the steady isentropic Euler system. We showed that there exists a critical value M_{cr}>0,if the given mass flux is less than M_{cr}, there exists a unique smooth subsonic

axially symmetric jet issuing from the given semi-infinitely long nozzle and hitting a given uneven wall. The surface of the axially symmetric impinging jet is a free boundary, which detaches from the edge of the nozzle smoothly. It is showed that a unique suitable choice of the pressure difference between the chamber and the atmosphere guarantees the continuous fit condition of the free boundary. Moreover, the asymptotic behaviors and the decay properties of the impinging jet and the free surface in downstream were also obtained. This is a joint work with Prof. Lili Du (SCU) and Dr. Qin Zhang (CQJTU).