北京理工大學

数学与统计学院学术报告

Equivalent characterization on Gevrey analyticity and optimal decay for viscous compressible fluids with capillarity

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摘 要： We investigate the Cauchy problem of Navier-Stokes equations for viscous compressible fluids with capillarity. The linear third-order capillarity behaves like the heat diffusion of density fluctuation, which allows to provide an equivalent characterization between Gevrey analyticity, optimal decay and initial regularity criteria. Precisely, it is proved that some Besov boundedness condition of the low-frequency part of initial perturbation is not only sufficient, but also necessary to achieve Gevrey analyticity or upper bounds of decay for arbitrary higher-order derivatives. Furthermore, the upper and lower bounds of decay hold if and only if the low-frequency part of initial perturbation belongs to a nontrivial subset of Besov space. Our approach is partly inspired by Hoff-Zumbrun's spectral analysis, and requires us to establish the uniform bounds on the growth of the radius of analyticity and the faster decay of the discrepancy between the nonlinear solution and the diffusion profile.

个人简介： 徐江，南京航空航天大学教授、博士生导师，现担任数学学院副院长。2007年在浙江大学获得博士学位，主要从事流体力学偏微分方程的研究。在可压缩Navier-Stokes方程、Boltzmann方程和耗散型双曲方程组解的适定性和长时间行为刻画方面取得了一系列研究成果，并发表在Adv. Math.、ARMA、CMP、JFA、Math. Ann.等国际数学期刊上。先后主持5项国家级项目，2019年入选教育部国家重大人才工程青年学者。2023年获得教育部高等学校科学研究优秀成果奖（科学技术）二等奖。2024 年入选江苏省“333 高层次人才培养工程”中青年领军人才。