Optimal large time behavior of the two-phase fluid model in the whole space

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链接入会：https://meeting.tencent.com/s/qpY2x8WhEwTO

报告摘要：We investigate the large--time behavior of strong solutions to a two-phase fluid model in the whole space $\mathbb R^3$. This model was first derived by [Y. P. Choi, SIAM J. Math. Anal., 48(2016)] by taking the hydrodynamic limit from the Vlasov-Fokker-Planck/isentropic Navier-Stokes equations with strong local alignment forces. Under the assumption that the initial perturbation around an equilibrium state is sufficiently small, the global well-posedness issue has been established in [Y. P. Choi, SIAM J. Math. Anal., 48(2016)]. However, as indicated by Y. P. Choi, the large-time behavior of these solutions has remained an open problem. In this article, we resolve this problem by proving convergence to its associated equilibrium with the optimal rate which is the same as that of the heat equation. Particularly, the optimal convergence rates of the higher-order spatial derivatives of the solutions are also obtained. Moreover, for well-chosen initial data, we also show the lower bounds on the convergence rates. Our method is based on Hodge decomposition, low-frequency and high-frequency decomposition, delicate spectral analysis and energy methods.

报告人简介：

吴国春，博士，现为华侨大学数学科学学院副教授。2008 年于厦门大学获得理学学士学位，2014 年于厦门大学获理学博士学位（硕博连读）。2012 年 9 月至 2013 年 8 月在纽约大学联合培养一年。2014 年 7 月至 2016 年 6 月在中国科学院数学与系统科学研究院做博士后研究。2016 年博士毕业论文被评为福建省优秀博士毕业论文。2017 年认定为泉州市第四层次人才和福建省 C 类人才。主要研究方向为流体力学中的非线性偏微分方程，近年来研究论文主要发表在 SIAM、JFA、JDE、P ROY SOC EDINB A 等。

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西北大学数学学院

2020 年 10 月 13 日