

TEMPLE UNIVERSITY

Department of Mathematics

Analysis Seminar

Zoom meeting

Monday, February 8 2021, 2:30 p.m.

Global Solutions of the Nernst-Planck-Euler Equations

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Abstract: The transport and the electrodiffusion of ions in homogeneous Newtonian fluids are classically modeled by the Nernst-Planck-Navier-Stokes (NPNS) equations. When the kinematic viscosity term in the Navier-Stokes equation is neglected, the NPNS system becomes the Nernst-Planck-Euler (NPE) system. In this talk, we consider the initial value problem for the NPE equations with two ionic species in two-dimensional tori. We prove the global existence of weak solutions and the global existence and uniqueness of smooth solutions. We also show that in the vanishing viscosity limits, smooth solutions of the NPNS equations converge to the solutions of the NPE equations. This is joint work with Mihaela Ignatova.