



Einladung zum Oberseminar Mathematik in den Naturwissenschaften

Julius-Maximilians-Universität Würzburg
Lehrstuhl für Mathematik in den Naturwissenschaften

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Viscous compressible fluids with discontinuous densities: old and new

In this talk, we focus on the well-posedness theory for the barotropic Navier-Stokes equations in a low regularity framework.

At first, we review the setting of weak solutions having finite energy, as set down by Lions–Feireisl. Next, we present the main points of Hoff’s theory, which allows for a more qualitative description of the dynamical properties of weak solutions. The flaw of Hoff’s results is that they hold for very special pressure laws and that, in general, they do not allow to get uniqueness of solutions in the considered framework.

In the second part of the talk, we discuss how going beyond Hoff’s theory. We consider initial velocity fields which have (slightly) sub-critical regularity, and initial densities which are merely bounded (with no further regularity assumptions); in particular, densities having discontinuities across an interface are allowed. We present a local in time existence and uniqueness result, which holds true in any space dimension and for general pressure laws; a qualitative description of the dynamics of the interface is also given. The proof of this result combines a maximal regularity approach with the study of propagation of geometric structures, in the same spirit of striated regularity *à la Chemin*.

We conclude the talk by showing how to adapt the previous approach to prove local well-posedness in presence of stratification effects.

This talk is based on joint works with *Raphaël Danchin* and *Marius Paicu*, and with *Edoardo Bocchi* and *Christophe Prange*.

Ort: Zoom video conference

Zeit: Donnerstag, 04.02.2021 um 14:15 Uhr

**You are cordially invited to this lecture. Request the Zoom link from
anja.schloemerkemper@mathematik.uni-wuerzburg.de**

gez. Anja Schlömerkemper