

NEWSLETTER

of the Work Group Mathematical Fluid Mechanics

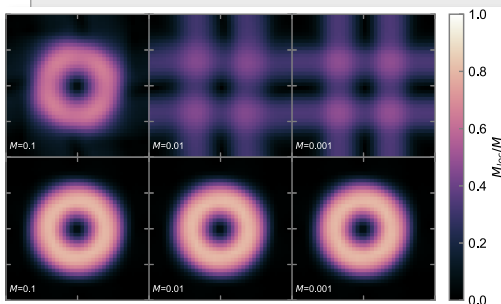
Newsletter no. 3 (2023)

Junming Duan submits DFG proposal

The German Science Foundation (DFG) accepts individual grant applications, which, if successful, pay for a PhD student or a post-doc. [Junming Duan](#) with my help wrote a DFG grant proposal "Efficient numerical simulation and reduced-order modeling using adaptive moving mesh and machine learning". If accepted, he will join our group as a post-doc beginning in the fall 2023.

Paper by Claudius gets accepted

The paper [Claudius Birke, Christophe Chalons and Christian Klingenberg: "A low Mach two-speed relaxation scheme for the compressible Euler equations with gravity"](#), *Communications in Mathematical Sciences*, vol. 21 (2023) has been accepted for publication. – Because of an unfortunate reviewing process this took 18 months, which is a long time in the life of a PhD student.



Numerical solutions of the compressible Euler equations with gravity of a vortical flow for different maximum Mach numbers M . The bottom row is the new scheme, the top row is a more traditional finite volume scheme.

DFG priority program review

The German Science Foundation (DFG) had a [priority program call](#) for research projects in the field of hyperbolic conservation laws. This field is well represented at German universities. Almost 50 applicants wrote proposals. Two of the applicants were Simon Markfelder and myself (jointly with Wasilij Barsukow). The DFG has money to fund projects of about half the applicants.

On Friday (Apr. 28) all applicants were reviewed in person in Bad Honnef. The review panel (12 persons, incl. Michael Dumbser, Carlos Parés, Eitan Tadmor, Alexis Vasseur) came from abroad, and are eminent experts in our field. Most of the day on Friday we applicants spent time together with the review panel, with a mix of discussing our projects and just engaging in small talk. Such a congenial atmosphere between applicants and referees in such a competitive environment is unheard of in other countries. The idea of the DFG is, that this will bring out the best scientific evaluation of the projects.

Finally the good news: both Simon's and my project with Wasilij will be supported. In particular this means that Simon, when his one year Humboldt fellowship ends in March 2024, will have three more years with this DFG grant. I will have the funds to hire a PhD student doing our Active Flux project.

Fritz Röpke received an ERC grant

Different grants supporting one's research have different levels of prestige. A successful grant from the European Research Council is most highly regarded. Thus it is considered a crowning achievement for the astrophysicist Fritz Röpke that he [received an ERC grant](#).

We have been collaborating with him for quite a while (our first co-publication was 6 years ago). This collaboration led us to a deep understanding of numerical schemes for the compressible Euler equations. The topic of our successful DFG priority program grant application above is a direct outcome of that.



the logo of the DFG priority program



Fritz Röpke

Claudius, Kathrin and Lena had their HYP 2022 proceedings accepted

The bi-yearly conference on hyperbolic problems [HYP2022](#) will publish proceedings.

These 3 articles have been accepted:

- [Claudius Birke and Christian Klingenberg: "Finding an Approximate Riemann Solver via Relaxation: Concept and Advantages"](#)
- [Kathrin Hellmuth, Christian Klingenberg, Qin Li: "Multi-scale PDE inverse problem in bacterial movement"](#)
- [Lena Baumann, Marlies Pirner "Linear Landau damping for a two-species Vlasov-Poisson system for electrons and ions"](#).

Kurganov emphasis semester

In spring of 2024 Alexander Kurganov will organize a [Special program on Numerical Methods for Nonlinear Hyperbolic PDEs at SUSTech, Shenzhen, China](#). I plan to attend for two weeks in the first half of March 2024.

HONOM 2024

The conference on **H**igh-**O**rd**er** **N**onlinear numerical **M**ethods for evolutionary **P**DEs (HONOM) takes place every two years and focuses on numerics of conservation laws. Next year it will take place in Crete, with Elena Gaburro organizing it, [see here](#).



Emil Wiedemann visits us July 11

[Emil Wiedemann](#) works on topics related to Simon Markfelder's work. This semester he has moved to the University of Erlangen.

Emil will visit us on Tuesday, July 11 and lecture on [Analysis of Turbulent Flows](#).

Upcoming scientific conferences

Click the links to check where you might want to participate.

- May 22 - 26, 2023: [Sharing Higher-order Advanced Research Know-how on Finite Volume \(SHARK-FV\)](#) in Portugal, organized by Raphael Loubère and others
- May 30 - June 3, 2023: [Annual meeting of the Gesellschaft für angewandte Mathematik und Mechanik \(GAMM\)](#) in Dresden
- June 5 - 9, 2023: [Emerging topics in applications of optimal transport](#) at ETH Zürich, organized by [Alessio Figalli](#) and [Yunan Yang](#)
- June 26 - 30, 2023: [NumHyp 2023 \(Numerical methods for hyperbolic problems\)](#) in Bordeaux, France, organized by Raphael Loubère and others
- Aug. 14 - 16, 2023: [Workshop on Stability, Mixing and Fluid Dynamics](#), organized by Benjamin Gess, Emil Wiedemann and others
- Sept. 4 - 8, 2023: [European Conference on Numerical Mathematics and Advanced Applications \(ENUMATH\)](#), in Lisbon, Portugal
- Sept. 4 - 8, 2023: [11th Applied Inverse Problems Conference](#), in Göttingen, organized by T. Hohage, G. Uhlmann and others
- Sept. 10 - 16, 2023: [16th Hirschegg Workshop on Conservation Laws](#), in the Alps (Kleinwalsertal), organized by Gerald Warnecke and others
- Sept. 25 - 29, 2023: Sino-German workshop, in Beijing, organized by Gerald Warnecke and others
- Oct. 30 - Nov. 3, 2023: [Finite Volumes for Complex Applications in Strasbourg](#) in Strasbourg, France, organized by Philippe Helluy and others
- March 3 - May 31, 2024: [Numerical Methods for Nonlinear Hyperbolic PDEs](#), in Shenzhen, China, organized by Alex Kurganov, Chi-Wang Shu and Alina Chertok 
- May or June of 2024: [International Conference on Hyperbolic Problems: Theory, Numerics and Applications \(HYP 2024\)](#) in Shanghai, China, organized by Shi Jin
- Sept. 9 - 13, 2024: [Conference on high-order nonlinear numerical methods for evolutionary PDEs](#) (HONOM2024) on the Crete Island, Greece, organized by Elena Gaburro 



Emil Wiedemann