NEWSLETTER

of the Work Group Mathematical Fluid Mechanics

Newsletter no. 18 (2021)

Semester-end-party on July 18

Semesterabschluss-Fest bei mir zu Hause

Sonntag, 18. Juli 2021 ab 18:00 Uhr
Unterer Neubergweg 17B in Würzburg

Bitte *Essen mitbringen* für ein Buffet.

Ich besorge die Getränke.

Ich freue mich auf Ihr Kommen!
Christian Klingenberg

Wahrscheinlich werden wir viel draussen auf der Terrasse sein können. Bringen Sie sich ein warme Jacke mit .

Our Semester-end-party next Sunday will be in person. I have sent out the corona hygiene concept, where (among other things) I ask you to have a Corona test before you come. Let me know if you have not received it.

This week: ICOSAHOM ~~2020~~ 2021

This week (July 12 - 16) the *International Conference on Spectral and Higher Order Methods* (ICOSAHOM ~~2020~~ 2021), which had originally been planned for last year in Vienna, will now be held online.

This conference series began in 1989 and is held every three years. It started out as a spectral methods meeting, but has broadened out to (higher order) numerical methods for PDEs.

The main part of this large meeting consists of parallel contributed mini-symposia and of contributed talks. From our work-group Claudius Birke will lecture on Wednesday at 2:40 pm, *see here*. I will lecture just before him. On Thursday from 12 noon on, Wasilij Barsukow and myself will run a mini-symposium "High order multi-dimensional structure preserving methods" with 8 speakers, among them Wasilij Barsukow, Gero Schnücke, Bruno Despres and myself (again), *see here* (part 1) and *see here* (part 2).
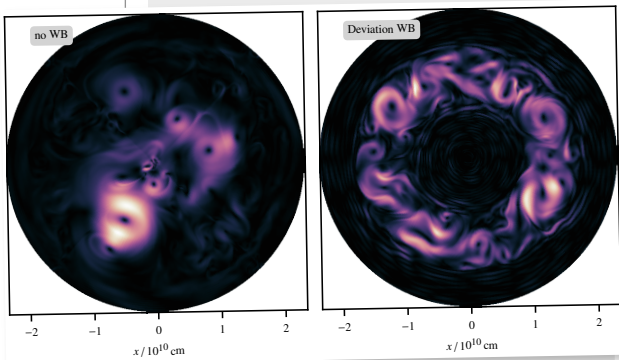
In case you have a problem to attend a lecture, let me know and I will try to help.

Paper with Fritz Röpke et.al. accepted

This paper with Fritz Röpke's group has been accepted: *Edelmann, Horst, Berberich, Andrassy, Higl, Klingenberg, Röpke: "Well-balanced treatment of gravity in astrophysical fluid dynamics simulations at low Mach numbers", Astronomy & Astrophysics, section 15, Numerical methods and codes (2021)*.

This summarizes (from Fritz Röpke's point of view) our work of the past years. The main initiative to for this paper began with Jonas Berberich and was continued by *Philipp Edelmann*.

Simulation of convection inside a star. As seen on the right, the star has a zone between its center and its outside where the is turbulent convection leads to diffusive transport of the material produced by fusion in the center to the outer boundary of the star. Only a well-balanced (WB) scheme (on the right panel) can capture this correctly.

Paper with Yunguang Lu accepted

The paper *C. Klingenberg; Y. Lu, C. Xue: "Global weak solution; polymer flooding models; compensated compactness", Applied Mathematics Letters, Vol. 122 (2021)* has been accepted for publication. This is an ongoing series of many papers with Yunguang Lu based on compensated compactness.
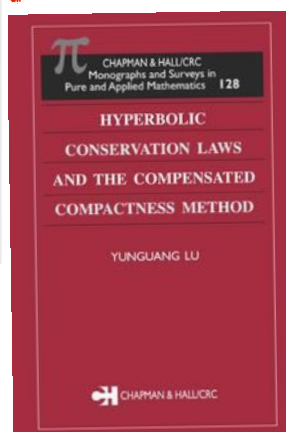
Upcoming scientific conferences

Go ahead and click the links to check where you might want to participate.

2021:

- July 12 - 16: *International Conference on Spectral and Higher Order Methods* ICOSAHOM 2020, Vienna (online only), Wasilij and myself have organized a mini-symposium there

- July 26 - 30: *Numerical methods for hyperbolic problems, NumHyp2021* in Trento (hybrid), organized by Michael Dumbser

- Sept. 12 - 18: *Hirschegg Workshop On Conservation Laws* in Kleinwalsertal in Austria, organized by among others Gerald Warnecke

- fall: Special program on Numerical Methods for Nonlinear Hyperbolic PDEs; at SUSTech, Shenzhen, China: organized by Alex Kurganov (still in the planning stage)

2022:

- Jan. 10 - 14: *Workshop on tissue growth and movement*, at the Poincaré Institute in Paris, co-organized by Perthame

- March 14 - 18, 2022: *SIAM Conference on Analysis of Partial Differential Equations* in Berlin, organized by Sid Mishra and Emil Wiedemann

- May 16 - 20, 2022: *The Boltzmann Equations: in the trail of Torsten Carlemann*, near Stockholm, Sweden

- March or April, 2022: *HIGH ORDER NONLINEAR NUMERICAL METHODS FOR EVOLUTIONARY PDEs: THEORY AND APPLICATIONS (HONOM)* in Braga, Portugal, organized by Raphael Loubère und Stephane Clain

- end of May 2022: *Sharing Higher-order Advanced Research Know-how on Finite Volume (SHARK-FV)* in Portugal, organized by Raphael Loubère und Stephane Clain (still in its planning stage)

- June 5 - 9, 2022: *ECCOMAS congress* (ECCOMAS = European Community on Computational Methods in Applied Sciences), in Oslo

- June 20 - 25: HYP2022:*18th International Conference on Hyperbolic Problems, Theory, Numerics, Applications* - Part 2 (formerly HYP 2020), in Malaga, Spain, organized by Carlos Pares

- July 18 - 22, 2022: *When Kinetic Theory meets Fluid Mechanics*, Zürich

- Sept. 5 - 9, 2022: *10th International Conference on Numerical Methods for Multi-Material Fluid Flow (MULTIMAT 2021)* in Zürich, organized by Remi Abgrall

Yunguang Lu has written a textbook on compensated compactness