

# Numerical Techniques in MHD Simulations

## Conference Program

**Keynote presentations:** 38 min talk + 7 min discussion  
**Invited talks:** 25 min talk + 5 min discussion  
**Contributor talks:** 15 min talk + 5 min discussion



complexsystems.uni-koeln.de  
 mhd-sim@uni-koeln.de

### Wednesday, August 16

Session 1: Intro & Codes			
09:00		Welcome Address	
09:15	Daniel Verscharen	The Applicability of MHD to Describe a Collisionless Plasma Like the Solar Wind	invited talk
09:45	Helen Yee	Skew-Symmetric Splitting and Stability of High Order Central Schemes	keynote presentation
10:30	Alexey Ryakhovskiy	MHD control of non-equilibrium high-speed flow	contributor talk
10:50		Coffee break	
Session 2: Codes & Solar System			
11:20	Gabor Toth	The University of Michigan MHD code: BATS-R-US	keynote presentation
12:05	John Lyon	GAMERA -- The New Magnetospheric Code	invited talk
12:35	Antti Lakka	The non-linearity of the cross-polar cap potential during high solar wind driving: GUMICS-4 results	contributor talk
12:55	Tom Elsden	The Theoretical Foundation of 3D Alfvén Resonances	contributor talk
13:15		Lunch break	
Session 3: Solar System			
14:30	Stefaan Poedts	EUHFORIA: a solar wind and CME evolution model	contributor talk
14:50	Paolo Pagano	Combined Global NLFFF simulations and MHD simulations	invited talk
15:20	Dana-Camelia Talpeanu	Numerical Modelling of Stealth Solar Eruptions	contributor talk
15:40		Coffee break	
Session 4: Solar System			
16:10	Lea Griton	Background/residual decomposition for the magnetic field in MHD simulations using a time-dependent $B_0$ - application to Saturn-like and Uranus-like magnetospheres	invited talk
16:40	Joachim Saur	MHD Boundary Conditions at Electrically Non-Conductive Bodies	contributor talk
17:00	Aljona Blöcker	Magnetohydrodynamic simulations of Io's and Europa's plasma interaction	contributor talk
17:20		End of session	

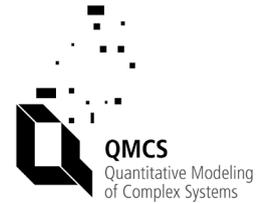
## Thursday, August 17

Session 5: Codes & Solar System			
09:00	Rony Keppens	Recent add-ons to the MPI-AMRVAC framework	keynote presentation
09:45	Emmanuel Chané	MHD simulations of the gas giants' magnetospheres	invited talk
10:15	Michal Hanasz	Implementation of energy dependent transport of cosmic rays in PIERNIK MHD code	invited talk
10:45		<i>Coffee break</i>	
Session 6: Discont. Galerkin & Technical MHD			
11:15	Michael Dumbser	High order ADER schemes for a unified first order hyperbolic formulation of Newtonian continuum mechanics coupled with electro-dynamics	keynote presentation
12:00	Florian Hindenlang	Mesh generation and resistive MHD simulations for plasmas in fusion devices with a parallel 3D DGSEM framework	contributor talk
12:20	Marvin Bohm	Discontinuous Galerkin schemes for Magneto-Hydrodynamics	contributor talk
12:40	Fabiano Carvalho de Castro Sene	Power Modeling of a MHD Faraday type generator	contributor talk
13:00		<i>Lunch</i>	
Social program and sightseeing			
		<i>See final page for suggestions.</i>	
19:00		<i>Conference Dinner (Brauhaus SÜNNER im Walfisch)</i>	

## Friday, August 18

Session 7: Finite Volume & Astro			
09:00	Christian Klingenberg	Towards stable numerical schemes for magneto-hydrodynamics and applications in astrophysics	keynote presentation
09:45	Andrew Winters	Entropy Conservation, Stability, and Numerical Partial Differential Equations	contributor talk
10:05	Dominik Derigs	Ideal GLM-MHD: About the novel entropy-consistent nine-wave magnetic field divergence diminishing ideal magnetohydrodynamics equations	contributor talk
10:25		<i>Coffee break</i>	
Session 8: Codes & Astro			
10:55	Daniel Price	MHD with particle methods — an overview of Smoothed Particle Magnetohydrodynamics	keynote presentation
11:40	Thomas Guillet	Towards fast high-order MHD for astrophysics in the AREPO code	contributor talk
12:00	Ileyk El Mellah	Wind accretion in Super Giant X-ray Binaries	contributor talk
12:20	Prabesh Raj Joshi	On the resolution requirements for modelling molecular gas formation	contributor talk
12:40	Alex Lazarian	Modern understanding of MHD turbulence: theory and implications	invited talk
13:10		<i>Lunch break</i>	
14:30		<i>Final discussion</i>	

# Suggestions for the Social Program / Sightseeing on Thursday Afternoon



complexsystems.uni-koeln.de  
mhd-sim@uni-koeln.de

## Cologne Cathedral

- Walk through
- Climb the towers (phantastic view)

## Panoramic 1 hour Rhine river boat tour

- €10.40, time: 13:30, 15:00, 16:30
- KD Ticket Office Köln: Frankenwerft/Am Leystapel
- <https://www.k-d.com/de/anleger/koeln/>

## Römisch-Germanisches Museum

- Sculptures and ruins of Roman artefacts found along the Rhine
- €9, 10am-5pm

## Museum Schnütgen

- a repository of medieval religious art and sculpture.
- €6, 10am-8pm

## Wallraf-Richartz-Museum

- A famous collection of European paintings from the 13th to the 19th centuries.
- €12, 10am-6pm

## Museum Ludwig

- Contemporary art, mix of works from all major phases.
- €12, 10am-6pm

## Schokoladenmuseum

- The art of chocolate-making, exhibits on the origin of the 'elixir of the gods', as the Aztecs called it
- €11.50, 10am-6pm

## Conference Dinner (Thursday, 7 PM)

### Brauhaus Sünner im Walfisch

Salzgasse 13, 50667 Cologne

Tram stop Heumarkt (lines 1, 7, 9)

Selected menu with price covered by meeting. Two drinks are covered, the rest needs to be paid separately.

