

1 Title of the workshop

MAGNETOHYDRODYNAMICS: Classical physics for the 21st century

2 Program

only onsite onsite+remote

- Monday:

09.00-10.00: Arrival and registration

10.00-10.20: Welcome from the Lorentz Centre representatives,

announcements from organizing committee (Rony/Stefaan)

THEME 1: Plasma physics in laboratory and astrophysics

10.20-11.00: Opening tutorial lecture: *MHD waves in flowing media*

Hans Goedbloed

11.00-11.20: Open discussion (hybrid) on role of *MHD spectroscopy*

moderator: Rony Keppens

11.20-12.00: Demonstration **LEGOLAS** for *MHD wave spectroscopy*:

Niels Claes & Jordi De Jonghe

12.00-14.00: lunch break

14.00-15.00: Hands-on experimenting with **Legolas** for MHD spectroscopy

(in 4 onsite teams supervised by Jordi/Niels/Jean-Baptiste/Rony)

15.00-15.05: welcome to US-based participants, morning summary (Rony)

15.05-15.45: invited (online) keynote

Magnetic Reconnection and Turbulence Mediated by the Plasmoid Instability

Amitava Bhattacharjee (Princeton)

15.45-16.00: online discussion round on waves in plasmas

using 3 breakout rooms (MHD/ideal two-fluid/beyond ideal)

moderators: Hans/Rony/Stefaan

16.00-16.30: coffee break

16.30-17.00: Solicited contribution *waves in self-gravitating media*:

Jean-Baptiste Durrive

17.00-17.30: Solicited contribution *MHD modes in tokamaks*:

Guido Huijsmans

17.30-18.00: *Hybrid discussion forum*: moderators Rony Keppens and Andrew Hillier

18.00-19.00: welcoming reception

- **Tuesday:**

THEME 2: Controlling plasmas: from space weather to the laboratory

09.00-9.45: Invited talk on *Modern space weather frameworks and forecasting:*

Gabor Toth

09.45-10.30: Invited presentation on *space weather model aspects (AWSOM):*

Bart van der Holst

10.30-10.45: Open discussion on space weather efforts (Stefaan)

10.45-11.15: coffee break

11.15-12.15: contributed (online) presentation on *European space weather models:*

Christine Verbeke & Jens Pomoell

12.15-14.30: lunch break, followed by free discussion/worktime

14.30-15.00: contributed (online) talk *aspects beyond ideal MHD*

Ben Snow

15.00-15.40: Invited (online) keynote:

SPARC - the Bullet Train to Fusion Power

Jeffrey Freidberg

15.40-16.00: online discussions with Freidberg and all participants

Moderator: Jack Jenkins

16.00-16.30: Coffee break

16.30-17.00: Contributed (online) talk on

Two-fluid numerical simulations of a partially-ionized solar atmosphere

Kris Murawski

17.00-18.00: *Open (hybrid) discussion forum:*

moderators Stefaan Poedts & Kris Murawski

Structured by 10 questions posed by moderators.

- **Wednesday:**

THEME 3: From solar to astrophysical applications

09.00-9.45: Invited (online) talk on *solar multi-fluid models*:

Elena Komenkho

09.45-10.15: Contributed (online) talk on *Astrophysical applications*:

Sven van Loo

10.15-10.45: Solicited (online) contribution

Plasmoid Chains: a route to achieving explosive and fast magnetic reconnection

Hubert Baty

10.45-11.15: coffee break

11.15-12.00: contributed talk on *computational aspects for multi-fluid*:

Beatrice Popescu

12.00-14.00: lunch break

14.00-15.00: Parallel onsite open discussion round

identification of common challenges and goals.

Divide the participants in 4 groups, mixing various disciplines.

Summaries made by Niels/Jack/Adam/Sebastiaan

15.00-15.30: coffee break

15.30-16.15: Invited (online) contribution on

An Introduction to Topological Waves in Fluids, MHD and Plasmas

Steve Tobias

16.15-17.00: Invited (online) contribution on *micro-macro-couplings*

Fabio Bacchini

17.00-17.45: Contributed (online) presentation on *PIC-MHD coupling*:

Fabien Casse

17.45-18.00: Discussion on MHD+kinetic/particle coupling aspects

Moderator: Hans Goedbloed

18.00-....?: Free time followed by Conference dinner

- **Thursday:**

THEME 4: Plasmas, waves and turbulence

09.00-9.45: Invited keynote: *whole solar modeling*:

Sacha Brun

09.45-10.30: Contributed talk on *stellar wind models*:

Victor Reville

10.30-10.45: open discussion: parallel solar/stellar, status whole sun models

Moderator: Stefaan Poedts

10.45-11.15: coffee break

11.15-12.00: contributed (online) talk on

Magneto-frictional modelling of the solar corona

Anthony Yeates

12.00-12.15: Open Discussion, moderator: Rony Keppens

12.15-14.00: lunch break

14.00-14.45: Invited (online) presentation on *MHD & turbulence*:

Alexander Schekochihin

14.45-15.30: Invited (online) contribution: *MHD turbulence theory*:

Sebastien Galtier

15.30-16.00: coffee break

16.00-17.00: Hands-on session with **BxC** tool

Jean-Baptiste Durrive & Mathieu Langer

17.00-18.00: *Open hybrid discussion forum*:

moderators Hans Goedbloed and Bart van der Holst

Structured by 10 + 10 questions from moderators.

- Friday:

THEME 5: Extreme astrophysical applications

09.00-9.45: Contributed presentation on *GRMHD applications*:

Oliver Porth

9.45-10.30: Invited presentation on *GRMHD*:

Hector Olivares

10.30-11.00: open discussion: status GRMHD modeling

moderators Oliver Porth and Rony Keppens

11.00-11.30: coffee break

11.30-12.15: Invited presentation on

The nature of the intense dissipation structures in MHD turbulence

Pierre Lesaffre

12.15-13.15: Closing (hybrid) discussion: formulating novel projects.

Start with summaries by Sebastiaan, Jack, Niels, Adam.

Identify 10 avenues for concrete joint future work.