

# Global Modelling of the Space Weather Chain

24 – 28 October 2016, Aalto University

## Workshop agenda

Location: T-building (#30 on campus map)

Oral presentations: room T3

Posters: T-building open space floors 2 & 3

Coffee & refreshments served outside T3 in lobby area

Registration: 2<sup>nd</sup> floor lobby outside room T3

## Day 1: Monday 24<sup>th</sup> October

11:00 12:15 Registration (T-building)

12:15 12:30 Opening words by Tuija Pulkkinen

**Afternoon Session: Solar wind and CME Modelling - Formation of Solar Flux Ropes**

Chair: Emilia Kilpua

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12:30	13:00	Tahar Amari	Magnetic environment of CME flux ropes (invited)
13:00	13:20	Erika Palmerio	Observation and modelling of erupting flux ropes and in-situ comparison
13:20	13:40	Satoshi Inoue	Formation and dynamics of the CME flux tube during the solar eruption
13:40	14:10	Jon Linker	Global modelling of coronal mass ejections (invited)
14:10	14:30	<b>Coffee break</b>	
14:30	14:50	Alexey Isavnin	FRi3D: A novel three-dimensional model of coronal mass ejections
14:50	15:10	Markus Battarbee	Hybrid-Vlasov simulations of propagating interplanetary shocks in 5 and 6 dimension
15:10	16:00	<b>Open discussion</b>	Chairs: Emilia Kilpua & Jon Linker
16:00	18:00	<b>Posters and icebreaker</b>	

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## **Day 2: Tuesday 25<sup>th</sup> October**

### **Morning Session: Solar wind and CME Modelling - CMEs and the heliosphere**

**Chair: Alexey Isavnin**

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09:00	09:30	Chris Möstl	Semi-empirical modeling of coronal mass ejection evolution in the inner heliosphere (invited)
09:30	09:50	Alexandr Afanasiev	Proton acceleration in coronal shocks: Results from coupling Monte Carlo particle simulations with semi-empirical shock modeling
09:50	10:10	Jens Pomoell	Coupling a data-driven coronal model with EUHFORIA for Sun-to-Earth modeling of coronal mass ejection evolution
10:10	10:30	<b>Coffee break</b>	
10:30	10:50	Mitsue Den	Global 3D MHD solar wind model: On connectivity of magnetic field from the solar surface to 1AU
10:50	11:50	<b>Open discussion</b>	Chairs: Chris Möstl & Stefaan Poedts
11:50	13:30	<b>Lunch break</b>	

### **Afternoon Geospace Modelling - Boundary regions and interfaces**

**Chair: Andrew P. Dimmock**

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13:30	14:00	Xuanye Ma	Modeling of transport processes driven by 3-D meso-scale Kelvin-Helmholtz instability (invited)
14:00	14:20	Tom Elsden	Deciphering satellite observations of compressional ULF waveguide modes
14:20	14:40	Sanni Hoilijoki	Variability of dayside reconnection in a global hybrid-Vlasov simulation
14:40	15:00	Tuija Pulkkinen	Magnetosheath influence on solar wind - magnetosphere coupling
15:00	15:20	<b>Coffee break</b>	
15:20	15:40	Yann Kempf	Magnetopause-foreshock interactions induced by dayside reconnection
15:40	16:00	Emmanuel Chané	The magnetosphere of the Earth under sub-Alfvénic solar wind conditions
16:00	17:00	<b>Open discussion</b>	Chair: Tuija Pulkkinen

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## **Day 3: Wednesday 26<sup>th</sup> October**

### **Morning Session: Geospace Modelling – Global Geospace Modelling**

**Chair: Sanni Hoilijoki**

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09:00	09:30	Minna Palmroth	Global hybrid-Vlasov simulations of the terrestrial magnetosphere (invited)
09:30	09:50	Lars Mejnertsen	Global modelling of the magnetosphere using the Gorgon code: first results and application to Earth and Neptune
09:50	10:10	Ian Whittaker	Simulation of magnetospheric X-ray emission from solar wind charge exchange.
10:10	10:30	<b>Coffee break</b>	
10:30	11:00	Giovanni Lapenta	How can we best use the current petascale and upcoming exascale computing power for space weather? (invited)
11:00	11:50	<b>Open discussion</b>	Chair: Giovanni Lapenta
11:50	13:10	<b>Lunch break</b>	

### **Afternoon Session: Geospace Modelling: Model coupling down to thermosphere and inner magnetosphere**

**Chair: Richard Boynton**

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13:10	13:40	Bill Lotko	Global simulations of the magnetosphere-ionosphere interaction (invited)
13:40	14:00	Juho Lipponen	A semi-empirical thermospheric model tuned for geomagnetically active conditions
14:00	14:20	David Koroncay	The AWDANET real-time plasmaspheric density monitoring network: an evaluation
14:20	14:40	Timothy Kodikara	Season-controlled assimilated thermospheric mass density profiles for solar minimum and solar maximum conditions
14:40	15:00	<b>Coffee break</b>	
15:00	15:20	Mary Hudson	ULF wave analysis and radial diffusion calculation using a global MHD model for the 17 March 2015 storm and comparison with the 17 March 2013 storm
15:20	15:40	Lars Daldorff	ULF waves, particle transport and energization in global MHD simulations with plasmasphere”
15:40	16:00	Loredana Perrone	Solar and geomagnetic activity as a source of the upper atmosphere parameter long-term trends
16:00	17:00	<b>Open discussion</b>	Chair: Bill Lotko

## **20:00: Conference Dinner**

Ravintola Kappeli Cellar,  
*Eteläesplanadi 1, 00130 Helsinki*

## **Day 4: Thursday 28<sup>th</sup> October**

### **Morning Session: Operational Space Weather Needs**

**Chair:** TBC

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09:20	09:50	Antti Pulkkinen	Modeling geomagnetically induced currents (GIC) (invited)
09:50	10:10	Ari Viljanen	Challenges in forecasting geomagnetically induced currents
10:10	10:30	Chigomezzyo Ngwira	Analysis and modeling of geophysical processes associated with induced extreme surface geoelectric field
10:30	10:50	<b>Coffee break</b>	
10:50	11:20	Yuri Shprits	Forecasting the radiation belt environment (invited)
11:20	11:50	Natasha Ganushkina	Modelling of the low-energy near-Earth electron environment using IMPTAM (invited)
11:50	13:00	<b>Lunch break</b>	

### **Afternoon Session: Operational Space Weather Needs**

**Chair:** Eija Tanskanen

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13:00	13:30	Richard Boynton	Modelling of the geospace with NARMAX (invited)
13:30	14:00	Michele Cash	Solar wind and CME Modelling: CMEs and heliosphere (invited)
14:00	15:00	<b>Coffee break &amp; posters</b>	
15:00	15:30	Stefaan Poedts	The ESA Virtual Space Weather Modelling Centre – Part 2 (invited)
15:30	16:00	David Jackson	Progress in the development of operational space weather forecasts at the Met Office (invited)
16:00	17:00	<b>Open discussion</b>	Chair: Antti Pulkkinen

## **Day 5: Friday 28<sup>th</sup> October**

### **Morning Session: Model Integration**

**Chair:** Antti Pulkkinen

09:00	09:30	Tiera Laitinen	24/7 Space Weather Service at Finnish Meteorological Institute (invited)
09:30	10:00	Eija Tanskanen	Regulations and risk assessments of space weather
10:00	10:30	Maria Kuznetsova	Model Integration at the Community Coordinated Modelling Center (invited)
10:30	11:00	Gabor Toth	Model integration within the Space Weather Modeling Framework (invited)
11:00	12:00	<b>Coffee &amp; discussion</b>	Chair: Eija Tanskanen
<b>12:00</b>	<b>Closing of the meeting</b>		

## Posters

Poster sessions (T-building):

Day 1: Monday 24<sup>th</sup>            16:00 – 18:00

Day 2: Thursday 27<sup>th</sup>            14:00 – 15:00

1. Tanja Amerstorfer	EIEvoHI: CME prediction based on heliospheric imaging
2. Markus Battarbee	Solar Energetic Particle propagation within and near a heliospheric current sheet
3. Andrew Dimmock	The role of magnetosheath dawn-dusk asymmetries on solar wind magnetosphere coupling processes
4. Miles Engel	Comparison of Van Allen Probes radiation belt proton data with test-particle simulation for the 17 March 2015 storm
5. Cristobal Espinoza	Role of magnetic field fluctuations in the evolution of the kappa distribution functions in the plasma sheet
6. Urs Ganse	Global-Local Interaction of Structures Formed in Earth Foreshock Waves
7. Gent Frederick	Long term variability in the MHD stellar-like dynamo - driving space climate
8. Ilja Honkonen	Predicting ground geoelectric field using magnetospheric model and 3d conductivity model of Earth
9. Reko Hynönen	Latitudinal variation of Pc5 power in IMAGE magnetometer network
10. Emilia Kilpua	Heliospheric Cataloguing, Analysis and Techniques Service (HELCATS)
11. Antti Lakka	Accuracy of MHD simulations: Effects of simulation initialization in GUMICS-4
12. Erkkka Lumme	Determination of the photospheric electric field for data-driven modelling of coronal mass ejections
13. Shabnam Nikbakhsh	Solar active regions magnetic complexity evolution from 1996 to 2015
14. Minna Mylly	Solar Wind-Magnetosphere Coupling Efficiency and Polar Cap Potential Saturation
15. Pyry Peitso	Latitudinal variation of magnetic field fluctuation rate
16. Ilkka Sillanpää	Case studies with van Allen Belt Probes and IMPTAM modeling
17. Eija Tanskanen	Decadal changes in the space weather chain
18. UH Space Physics Team	Heliospheric Shock Database