

# 2018 SDO Science Workshop - Programme

**Monday, 29 October 2018**

**08:00 Registration desk open**

## **Welcome & Introduction**

09:00 Welcome by the LOC

*David Berghmans & Veronique Delouille*

09:10 The Solar Dynamics Observatory, Eight Years of Science - **Invited**

*W. Dean Pesnell*

## **Session 2: Precursors and signatures of eruptive events**

*Chairs: Conveners: Barbara Thompson (GSFC), James Mason (GSFC)*

09:30 The Atmospheric Imaging Assembly: Science Highlights, Analysis Techniques and Instrument Status

*Mark CM Cheung, Wei Liu & the AIA Team*

10:00 Signatures of Magnetic Flux Ropes: What Are They and What Do They Do Before Eruption? - **Invited**

*Jiong Qiu*

## **10:30 Coffee break**

11:00 Which factors of an active region determine whether a strong flare will be CME associated or not?

*Christian Baumgartner, Julia K. Thalmann, Astrid M. Veronig*

11:15 The Origin of Major Solar Activity - Collisional Shearing Between Nonconjugated Polarities of Different Bipoles Nested Within Active Regions

*Georgios Chintzoglou, Jie Zhang, Mark C.M. Cheung, Maria Kazachenko*

11:30 Flare reconnection driven magnetic field and Lorentz force variations at the Sun's surface

*Krzysztof Barczynski, Guillaume Aulanier, Sophie Masson, Michael S. Wheatland*

11:45 Spatial and temporal localization of enhanced chromospheric 3-minute oscillations before, during, and after the 2011-February-15 X2.2 flare

*Laurel Farris, James McAteer*

## **12:00 Lunch break**

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- 13:15 Solar flare distributions: lognormal instead of power law?  
*Cis Verbeeck, Emil Kraaikamp, Olena Podladchikova*
- 13:30 Broken Self-Organized-Criticality Scenario for Solar Flares Energy Release Observed by SDO/AIA  
*Olena Podladchikova, Cis Verbeeck, Emil Kraaikamp*
- 13:45 Post-Flare Loop Signatures  
*Matthew West, Erika Palmerio, Daniel Seaton, Sabrina Savage*
- 14:00 An Observationally Constrained Model of a Flux Rope that Formed in the Solar Corona  
*Alexander W James, Gherardo Valori, Lucie M Green, Yang Liu, Mark C M Cheung, Yang Guo, Lidia van Driel-Gesztelyi*
- 14:15 Initiation of Stealth CMEs: Clues from Numerical Modelling and In-Situ Comparisons  
*Dana-Camelia Talpeanu, Francesco P. Zuccarello, Emmanuel Chané, Stefaan Poedts, Elke D'Huys, Skralan Hosteaux, Marilena Mierla*
- 14:30 The nature of imploding loops during solar eruptions as revealed by MHD simulations and AIA observations  
*Guillaume Aulanier, Jaroslav Dudik, F.P. Zucarello, Pascal Demoulin, Brigitte Schmieder*

**15:00 Coffee break and Posters Session**

- 16:30 Association between Tornadoes and Instability of Hosting Prominences  
*Irakli Mghebrishvili, Teimuraz Zaqarashvili, Vasil Kukhianidze, David Kuridze, David Tsiklauri, Bidzina Shergelashvili, and Stefaan Poedts*

**Session 1: Solar magnetic variability and irradiance over the solar cycle**

*Chairs: Conveners: Marc DeRosa (LMSAL), Jesper Schou (MPS)*

- 17:00 Solar irradiance variability and surface magnetism - **Invited**  
*Kok Leng Yeo, Sami Solanki, Natalie Krivova*
- 17:30 The GOES EUVS Model: New Operational Spectral Irradiances from GOES-R  
*Edward M.B. Thiemann, Francis G. Eparvier, Thomas N. Woods, Andrew R. Jones, Martin Snow, Donald L. Woodraska, Janet Machol*
- 17:45 Kinetic and Current Helicity of Long-Lived Activity Complexes During Solar Cycle 24  
*Rudolf Komm, Sanjay Gosain*
- 19:00 Welcome Reception @ Stadhuis Gent**  
*Botermarkt 1, 9000 Gent*

## Tuesday, 30 October 2018

### Session 2: Precursors and signatures of eruptive events (cont.)

*Chairs: Conveners: Barbara Thompson (GSFC), James Mason (GSFC)*

- 09:00 Studying the dynamics of coronal dimmings and their relationship to flares and coronal mass ejections  
*Karin Dissauer, Astrid M. Veronig, Manuela Temmer, Tatiana Podladchikova, Kamalam Vanninathan*
- 09:15 A new analysis of stability of active regions for understanding and predicting the onset of solar eruptions  
*Kanya Kusano, Sung-Hong Park, Tomoya Iju, Johan Muhamad, Naoyuki Ishiguro, Satoshi Inoue, Yumi Bamba*
- 09:30 Properties of Coronal Mass Ejections as Inferred from Coronal Dimming  
*Nariaki Nitta, Meng Jin*
- 09:45 Electric-current Neutralization and Eruptive Activity of Solar Active Regions  
*Yang Liu, Xudong Sun, Tibor Torok, Viacheslav S. Titov, James E. Leake*
- 10:00 Excess Lorentz Force in Major Solar Eruptions  
*Xudong Sun, Benjamin Lynch, William Abbett, Yan Li*
- 10:15 Studying stealth CMEs using advanced imaging analysis techniques  
*Jennifer O'kane, Lucie Green, David Long*

### 10:30 Coffee break

### Session 3: Subsurface motions and flows

*Chairs: Conveners: Dean Pesnell (GSFC), Rebecca Centeno (HAO/NCAR)*

- 11:00 HMI Summary - **Invited**  
*Todd Hoeksema*
- 11:30 Solar interior flows: Recent results and current challenges - **Invited**  
*Vincent Böning*

### 12:00 Lunch break

### Special Session: The AR12673 on Sept 1-10 2017

*Chairs: Conveners: Barbara Thompson (GSFC), Veronique Delouille (ROB)*

- 13:15 Precursors of magnetic flux emergence in the moat flows of active region AR12673  
*Raphael Attie, Michael Kirk, Barbara Thompson, Karin Muglach, Aimee Norton*

- 13:30 Joint observation of the X9.3 and X8.3 flares of September 6 and 10 2017 by SDO/EVE, PROBA2/LYRA and MAVEN/EUVM  
*Marie Dominique, Andrei N. Zhukov, Petr Heizel, Edward Thiemann, Laurent Dolla, Laurence Wauters, Ingolf Dammasch, Giovanni Lapenta*
- 13:45 Coronal and chromospheric observations of pre- and post-flare plasma evolution  
*David Long, Aaron Reid, Louise Harra, Mihalis Mathioudakis*
- 14:00 SDO/EVE Observations of Lyman Continuum Emission During Solar Flares  
*Ryan O. Milligan, Marcos E. Machado, Paulo J. A. Simões*
- 14:15 Evolution of flux rope, CME and associated EUV wave in the 10-Sep-2017 X8.2 event  
*Tatiana Podladchikova, Astrid M. Veronig, Karin Dissauer, Manuela Temmer, Daniel B. Seaton, David Long, Jingnan Guo, Bojan Vršnak, Louise Harra, Bernhard Kliem*
- 14:30 Waves of Magnetic-field Variations Observed in Flare-excited Sunquake Events  
*Junwei Zhao & Ruizhu Chen*
- 14:45 Analyzing the kinematics of EUV waves by combining simulations and multi-instrument observations  
*Alexandros Koukras, Christophe Marqué, Cooper Downs, Laurent Dolla*

**15:00 Coffee break and Posters Session**

**Session 3: Subsurface motions and flows (cont.)**

*Chairs: Conveners: Dean Pesnell (GSFC), Rebecca Centeno (HAO/NCAR)*

- 16:30 Statistical constraints on active region emergence from the surface motion of the polarities  
*Hannah Schunker, Aaron Birch, Robert Cameron, Doug Braun, Laurent Gizon*
- 16:45 Revisiting helioseismic constraints on subsurface convection  
*Aaron Birch, Tom Duvall, Laurent Gizon, Shravan Hanasoge, Bradley Hindman, Kaori Nagashima, Katepalli Sreenivasan*
- 17:00 Temporal evolution of solar meridional flow in the deep interior during 2010-2018  
*Ruizhu Chen, Junwei Zhao*
- 17:15 Twenty-one-year helioseismic measurement of solar meridional circulation from SOHO/MDI and SDO/HMI: Anomalous northern hemisphere during cycle 24  
*Zhi-Chao Liang, Laurent Gizon, Aaron C. Birch, Thomas L. Duvall, Jr., S. P. Rajaguru*
- 17:30 HMI Full-disk Vector Magnetograms: Products and Issues  
*Yang Liu, HMI team*
- 17:45 HMI Data Corrected for Scattered Light Compared to Hinode SOT-SP Data  
*A.A. Norton, T.L. Duvall, Jr., J. Schou, M.C.M Cheung, P.H. Scherrer, K.C. Chu, J. Sommers*
- 18:00 Study of the characteristics of Compact Interplanetary Radio Type IV Bursts  
*Nasrin Talebpour Sheshvan, Silja Pohjolainen*

## Wednesday, 31 October 2018

### Session 4: Data-driven modeling of solar atmosphere and solar explosive events (part 1)

*Chairs: Conveners: Meng Jin (LMSAL), Veronique Delouille (ROB)*

- 09:00 Data-driven Models of the Solar Corona Magnetic Fields: Review - **Invited**  
*Maria Kazachenko*
- 09:30 Ellerman bombs and UV bursts: reconnection at different atmospheric layers?  
*Viggo Hansteen*
- 09:45 The role of small-scale photospheric motions in coronal magnetic energy buildup and explosive release  
*Joel Dahlin ,Spiro Antiochos ,C. Richard DeVore*
- 10:00 Energy transport and heating by torsional Alfvén waves in the quiet-Sun atmosphere  
*Roberto Soler, Jaume Terradas, Ramon Oliver, Jose Luis Ballester*
- 10:15 Simulation of dynamics of hot plasma in postflare loops  
*Sergei Shestov, Andrei Zhukov, Tom Van Doorselaere*

#### **10:30 Coffee break**

- 11:00 Variation of Doppler velocity with non-thermal line width in a gravitationally stratified plasma  
*Vaibhav Pant, Norbert Magyar, Tom Van Doorselaere, Richard Morton*
- 11:15 Understanding Heating Properties of Active Region Loops through Forward Modeling and Machine Learning  
*Will Barnes, Stephen Bradshaw, Nicki Viall, Stuart Mumford*

### Session 5: Frontier: Solar Poles Exploration and new prospects

*Chairs: Conveners: Rebecca Centeno (HAO/NCAR), Barbara Thompson (GSFC)*

- 11:30 Extreme ultraviolet Variability Experiment (EVE): Status and Recent Science Results - **Invited**  
*Tom Woods and the SDO/EVE team*
- 12:00 Lunch break**
- 13:15 Beyond Flatland: A Star of Many Dimensions - **Invited**  
*Sarah Gibson*
- 13:45 The EUV instrument onboard Solar Orbiter: the EUV corona imaged differently  
*David Berghmans, Pierre Rochus, Frédéric Auchère, Louise Harra, Werner Schmutz, Udo Schühle*

Wednesday, 31 October 2018

- 14:00 Solar EUV Irradiance Monitoring beyond SDO-EVE: GOES EXIS Preliminary Measurements and Validation  
*Francis Eparvier, Andrew Jones, Thomas Woods, Martin Snow, Edward Thiemann, William McClintock, Donald Woodraska, Janet Machol, Rodney Viereck, Thomas Eden, Steven Mueller, Randle Meisner*
- 14:15 The High-Resolution Coronal Imager 2.1  
*Laurel A Rachmeler, Amy R Winebarger, Sabrina L Savage, Ken Kobayashi, and the rest of the Hi-C team.*
- 14:30 LWS talk  
*Madhulika Guhathakurta*

**15:00 Coffee break and Posters Session**

**Session 6: Magnetic structure of the corona and its transition to the heliosphere**

*Chairs: Conveners: David Berghmans (ROB), Marc DeRosa (LMSAL)*

- 16:30 Exploring the Middle Corona with a New Generation of Instruments - **Invited**  
*Dan Seaton*
- 17:00 Counter-streaming flows in a giant quiet-Sun filament  
*Andrea Diercke, Christoph Kuckein, Meetu Verma, Carsten Denker*
- 17:15 Characteristics of ephemeral coronal holes  
*Andrew Inglis, Rachel O'Connor, Dean Pesnell, Michael Kirk, Nishu Karna*
- 17:30 Three-dimensional structure of a coronal streamer observed by SOHO/LASCO and STEREO/COR2  
*Bieke Decraemer, Andrei Zhukov, Tom Van Doorselaere*
- 17:45 Spatiotemporal Analysis of Coronal Loops Using SDO/AIA  
*David Pascoe*
- 19:00 Conference Dinner @ Oude Vismijn**  
*Entrance via a bridge in Jan Breydelstraat, 9000 Gent*

## Thursday, 1 November 2018

### Session 7: Machine Learning and Forecasting

*Chairs: Conveners: Veronique Delouille (ROB), Meng Jin (LMSAL)*

- 09:00 Deep Learning and solar data processing - an introduction with applications - **Invited**  
*Vincent BARRA*
- 09:30 Sunspot Group Classification using Neural Networks  
*S. A. Maloney, P. T. Gallagher*
- 09:45 AI-generated magnetogram and EUV image of the Carrington event and the estimation of its Dst value  
*Harim Lee, Y.-J. Moon, Daye Lim, Eunsu Park, and Taeyoung Kim*
- 10:00 Solar EUV Spectral Irradiance by Deep Learning  
*Paul Wright, Richard Galvez, Alexandre Szenicer, Rajat Thomas, Meng Jin, David Fouhey, Mark Cheung, Andres Munoz-Jaramillo, Graham Mackintosh*
- 10:15 Statistically Identifying Systematics from Far-side Acoustic Images  
*Shea A. Hess Webber, Junwei Zhao*

### 10:30 Coffee break

### Session 6: Magnetic structure of the corona and its transition to the heliosphere (cont.)

*Chairs: Conveners: David Berghmans (ROB), Marc DeRosa (LMSAL)*

- 11:00 The Coronal Monsoon: Thermal Nonequilibrium revealed by periodic coronal rain  
*Frédéric Auchère, Clara Froment, Elie Soubrié, Patrick Antolin, Ramon Oliver*
- 11:15 A new method for measuring relative abundances in the solar corona  
*Zambrana Prado Natalia, Buchlin Eric*
- 11:30 Using SDO/AIA to Understand the Thermal Evolution of Solar Prominence Formation  
*Nicholeen Viall, Therese Kucera, and Judith Karpen*
- 11:45 Modelling the Multi-Stranded Nature of Coronal Loops  
*Thomas Williams*

### Session 8: Solar/stellar magnetic activity and its influence on planetary bodies

*Chairs: Conveners: James Mason (GSFC), Marc DeRosa (LMSAL)*

- 12:00 The Solar-Stellar-Exoplanet Connection - **Invited**  
*Allison Youngblood*
- 12:30 **Lunch @ Thagaste**  
Tour of the library

**13:30 Posters Session**

- 15:00 Stellar flares observed in long cadence data from the Kepler mission  
*Tom Van Doorselaere, Hoda Shariati, Jonas Debosscher*
- 15:15 Probability of Impact of CMEs from Active Stars with Terrestrial Exoplanets  
*Christina Kay, Vladimir Airapetian, Theresa Lueftinger*
- 15:30 Energetic Particle Events from Active Stars  
*Gang Li, Vladimir Airapetian, Junxiang Hu, Gary Zank*
- 15:45 Initiation of Superflares and Super-CMEs in Active Solar-type Stars  
*B. J. Lynch, V. S. Airapetian, M. D. Kazachenko, T. Lueftinger, C. R. DeVore, and W. P. Abbett*
- 16:00 Linking stellar flares to CMEs: energy partition and modeling  
*S. P. Moschou, D. Borovikov, O. Cohen, J. J. Drake, I. Sokolov, C. Garraffo, J.D. Alvarado-Gomez*
- 16:15 Evolution of a coronal mass ejection from the Sun to Saturn  
*Erika Palmerio, Emilia Kilpua, Andrei Zhukov, David Barnes, Marilena Mierla, Olivier Witasse, Teresa Nieves-Chinchilla, Beatriz Sánchez-Cano, Christian Möstl, Luciano Rodriguez, Elias Roussos, Jingnan Guo, Adam Masters, Gabrielle Provan, Alexey Isavnin, Neel Savani, Lucile Turc*

**16:30 Conclusion**

*Dean Pesnell*

**Mini-Workshop**

- 17:00 SunPy Mini-Workshop  
*Michael Kirk, Monica Bobra, Will Barnes*



## Friday, 2 November 2018

### Parallel Mini-Workshops

- 9:00 Demystifying machine learning  
*James Mason, Monica Bobra*  
*Augustinus Room*
- 9:00 Quest for the True Field: inter-calibration among vector-magnetograms  
*Todd Hoeksema, Alexei Pevtsov*  
*Monica Room*
- 9:00 EUV Calibration  
*Frank Eparvier, Dan Seaton*  
*Hippo Room*

### 10:30 Coffee break

- 11:00 SDO in the age of deep learning  
*Mark Cheung, Marc DeRosa, Meng Jin*  
*Augustinus Room*
- 11:00 Methods for ring diagram helioseismology  
*Rick Bogart, Aaron Birch, Jesper Schou*  
*Monica Room*
- 11:00 EUV Calibration (cont.)  
*Frank Eparvier, Dan Seaton*  
*Hippo Room*

### 12:30 Lunch @ Thagaste