

WG2: Theory Summary

Several talks and posters directly contributed to WG2, but there were more talks and posters relevant. It is difficult to distinguish theoretical work from observations and simulations

Hvar, Croatia 2018.9.28

WG2 RELATED TOPICS (talks, posters, discussions)

- Onset of CMEs: Torus instability, properties of source regions, acceleration phase
- CME-flare relation, the role of reconnection
- Coronal propagation of CMEs
- Heliospheric propagation of CMEs: B_z prediction, arrival time
- Forces, mass-loading, aerodynamic MHD drag, overall dynamics, arrival time
- CME-CME interactions, shock-CME interactions: momentum exchange and energy conversion
- Internal structure of ICMEs
- CME effects on the heliosphere
- CME-HSS interactions
- Forbush decreases (shock & flux-rope)

WG2 RELATED TALKS

- **Theory/Numerics:**

- On the role of the topology of magnetic clouds on galactic cosmic-ray Forbush decreases at energies above 70 MeV (Simone Benella)
- Forbush decrease model for expanding CMEs (Mateja Dumbović)
- Simulation of fast-mode MHD waves interacting with low density regions such as coronal holes (Isabell Piantschitsch)

- **Obs.->Theory:**

- Interaction between multiple CMEs and its impact on space weather (Chenlong Shen)
- Which factors of an active region determine whether a strong flare will be CME-associated or not? (Astrid Veronig)
- Influence of the Magnetic Decay Index Spatial Distribution on the Kinematics of the Solar Eruptive Prominence (Ivan Myshyakov)

- **Theory->Forecasting:**

- The Effects of Uncertainty on Deflection, Rotation and Bs predictions (Christina Kay)
- DBEM web application for heliospheric propagation of CMEs (Jaša Čalogović)

THE OVERALL AIM AND GOALS OF WG2

The overall aim of WG2 is to advance our comprehension of the physical background of Earth-affecting solar transients

The main goals are:

- to improve our understanding of the **structure and evolution of CMEs**, including magnetic flux ropes and driven shocks, as well as their origin;
- to improve comprehension of coronal/heliospheric **dynamics of CMEs**, including the **interaction** with ambient solar wind and interplanetary magnetic field, causing deceleration/acceleration and deflections;
- to get a better insight into how long does the **Lorentz force** dominate over the ~~aerodynamic~~ **MHD drag force**, including the estimation of the drag parameter and/or the dimensionless drag coefficient;
- to improve our capability in modelling and forecasting the **southward magnetic field component (B_s)** inside a CME;
- to **compare the theoretical results with observations**, e.g., 1 AU transit time, impact speed, impact magnetic field, etc.;

Thank you!