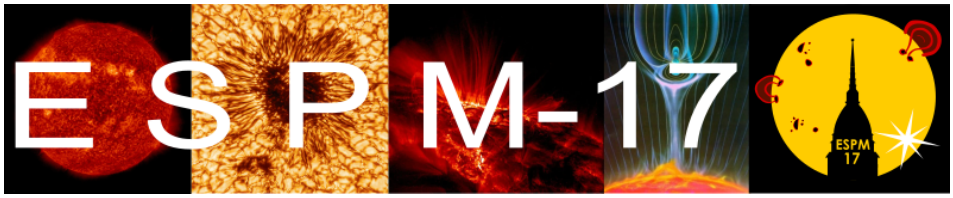

Contribution ID: **76** Type: **Poster**

Horseshoe CME model in EUHFORIA for geo-effectiveness predictions

Coronal mass ejections (CMEs) are giant expulsions of magnetized plasma from the Sun that manifest flux rope structures. Flux rope CME models such as the spheromak model with spherical geometry and the 'Flux Rope in 3D'(FRi3D) model with a global twisted magnetic flux tube geometry are already widely used in studying CME evolution and propagation in the heliosphere within the EUropean Heliosphere FORecasting Information Asset (EUHFORIA). Although the more realistic flux rope geometry of FRi3D is a significant upgrade over the spheromak model, its complex geometrical transformations are a drawback for fast and stable simulations. In this study, we discuss an optimal setup with a geometry more realistic than the spherical plasma blob while the simulations fast and robust enough for operational forecasting setup. This 'Horseshoe'CME model, based on the modified Miller-Turner topology, has been implemented in EUHFORIA and is a modification of the full torus model introduced by Linan et al. (2024). The geometrical implementation of the Horseshoe model is missing the back part of the torus which makes it a more realistic flux rope structure with two legs. In this work, we highlight the methods towards the numerical stability of CME leg disconnection. To make the simulations realistic, we constrain its geometric and magnetic field parameters from observations. We also present the validation of the Horseshoe model with observed CME events and demonstrate how different methods of constraining magnetic field parameters like flux and twist affect the space weather predictions at Earth.

Primary authors: MAHARANA, Anwesha (Centre for mathematical Plasma Astrophysics, KU Leuven); Dr LINAN, Luis (KU Leuven, Belgium); Prof. POEDTS, Stefaan (KU Leuven); MAGDALENIC, Jasmina (Royal Observatory of Belgium)

Session Classification: Coffee break and poster session 2

Track Classification: Space weather and the solar-heliospheric connections