



MHD Modeling of Coronal Disturbances Related to CME Lift-off

J. Pomoell and R. Vainio

Department of Physics, University of Helsinki, Finland (jens.pomoell@helsinki.fi, rami.vainio@helsinki.fi)

Different kinds of transient phenomena are common in the solar corona during the lift-off of coronal mass ejections (CMEs), such as EIT waves, metric type II bursts and solar energetic particle (SEP) events. While the exact nature and genesis of these disturbances is under debate, it is clear that erupting CMEs induce large-amplitude waves in the solar corona during the lift-off process that influence the coronal environment. Therefore, knowledge of the waves produced by evolving CMEs is essential for gaining insight into the interrelationship of the various solar transient phenomena.

In this study, we employ magnetohydrodynamic (MHD) simulations of CME lift-off to study the mass motions, shocks and other large-amplitude waves induced by the CME. We pay special attention to the first few minutes of the eruption. The relation to observed wave phenomena on the solar disk, and formation times of the CME-driven shocks and their possibility to produce energetic particles are addressed. In addition, we discuss the radio emissions produced by the shocks under different conditions in the ambient corona.