Geophysical Research Abstracts
Vol. 15, EGU2013-4171, 2013
EGU General Assembly 2013

2.5D MHD Simulations of the Kelvin-Helmholtz Instability at CME-Boundaries in the Solar Corona

Ute Möstl, Manuela Temmer, and Astrid Veronig
University of Graz, Institute of Physics, IGAM-Kanzelhöhe, Graz, Austria (ute.moestl@uni-graz.at)

We discuss the observation of a coronal mass ejection (CME) by the Atmospheric Imaging Assembly onboard the Solar Dynamics Observatory from 2011 February 24. This CME with an embedded filament shows periodic vortex-like structures at the northern side of the filament boundary with a wavelength of approximately 14.4 Mm and a propagation speed of about 310 $\pm$ 20 km/s. The morphological analysis hints at structures produced by the Kelvin-Helmholtz (KH) instability on the boundary of the filament. We conduct 2.5D numerical simulations of the KH instability, whose results yield qualitative as well as quantitative agreements with the observations. Furthermore, we study the absence of KH vortex-like structures on the southern side of the filament boundary and find that a magnetic field component parallel to the boundary with a strength of about 20% of the total magnetic field has stabilizing effects resulting in an asymmetric development of the instability.

This work receives funding from the Austrian Science Fund (FWF): P21051-N16, V195-N16 and P24092-N16.