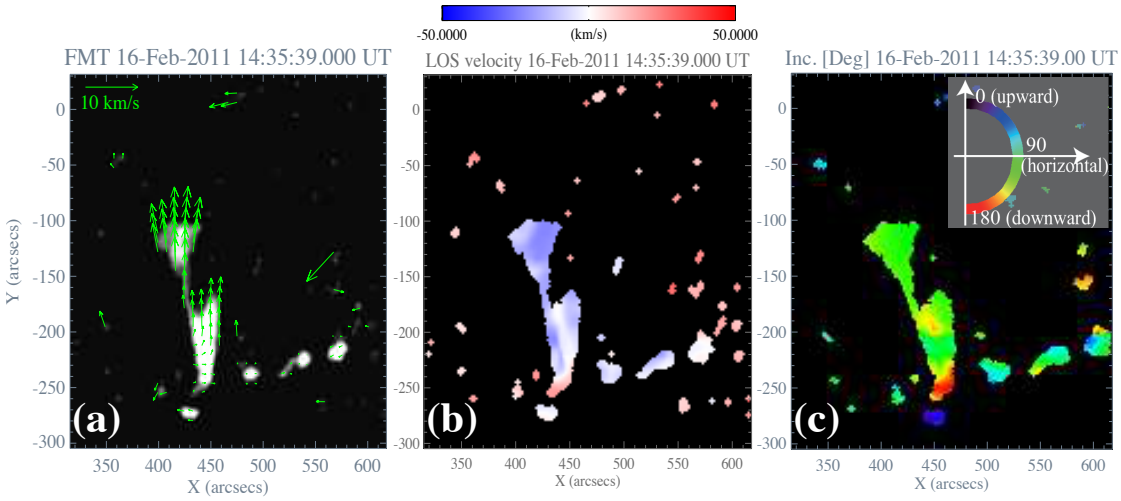
"Dandelion" Filament Eruption and Coronal Waves Associated with a Solar Flare on 2011 February 16

In the recent years the study of solar filament eruptions are extensively being carried out because they play a crucial role in triggering coronal mass ejections (CME). This latter considered as the primary driver of geomagnetic storms. Therefore, the importance reside in determining the real mass motion of the filament eruption, that is, in direction of the line-of-sight (LOS), which do provide valuable information to investigate Earth affecting CMEs.

Here we summarize the study of a filament eruption that accompanied a M-class flare on 2011 February 16. This event was captured in multiwavelength imaging Hα line by the Flare Monitoring Telescope (FMT), in operation at Ica National University, Peru. Combining observations in Hα line center and its wing (Hα $\pm$0.8 Å), the tangential (a) and the LOS (b) velocities were determined by applying local correlation tracking method and a modified Becker's cloud model, respectively. The composition of the tangential and the LOS velocity enabled us to derive the 3-dimensional velocity field of the erupting filament. In addition, by the mean of the derived velocity vectors, we estimate the inclination (c) of the erupting material with respect to the solar surface. Associated with this event, coronal waves in EUV and activation of quiescent filaments in Hα wing were also observed.

The main findings can be summarized as follows: (1) we could trace the temporal evolution of the velocity field and inclination of the filament eruption and compare them with EUV observations, (2) although the FMT may have missed detecting very fast component of the erupting material due to the limited off-band Hα images, the main part of the filament eruption was identified to travel with a LOS velocity of about 30 km s^{-1}, and (3) the inclination maps we performed leads us to conclude that the filament was ejected nearly horizontal to the solar surface. Regarding the filaments activation, the correlation in time suggests that they were activated by the coronal wave passage.



Reference:

Cabezas, D.P. et al., 2017, ApJ, 836, 33.

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