CME Observations with TESIS EUV Telescopes and LASCO Coronographs

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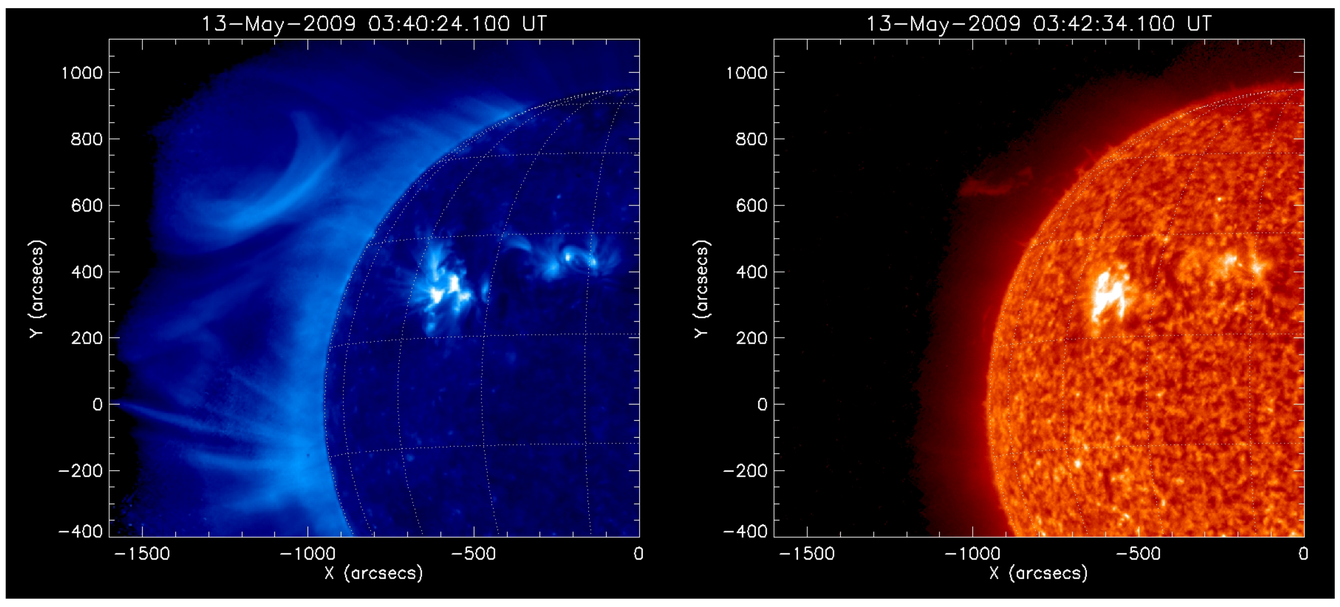
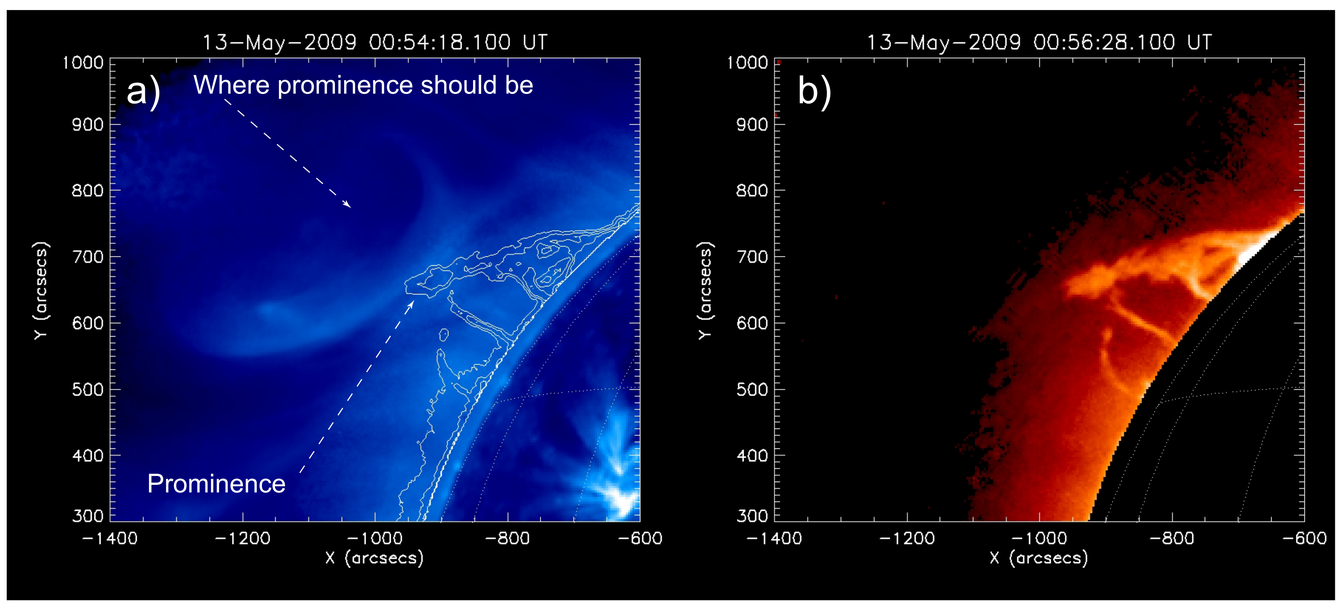
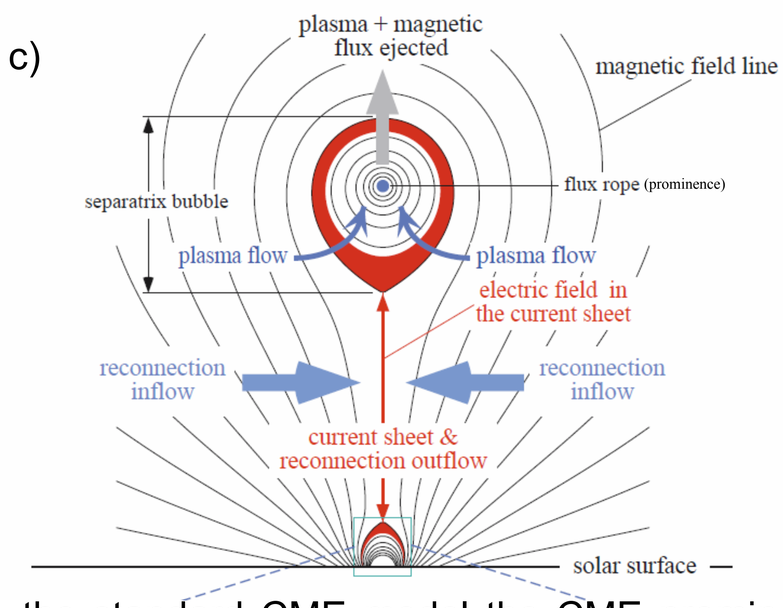


TESIS is an instrumentation assembly for solar investigations in EUV and soft X-ray. It was launched in 2009 onboard CORONAS-PHOTON satellite. TESIS included two EUV telescopes, which built images in 171 and 304 Å. Telescopes had resolution 1.7", field of view 1°, and cadence 10-15 minutes. TESIS 171 Å channel had high dynamic range – on its images we can distinguish structure of far corona. In this work we investigate CME, which occurred in 2009 May 13. This event was observed by TESIS 171 and 304 Å telescopes, and we can trace the whole CME evolution from the solar surface to the LASCO field of view.

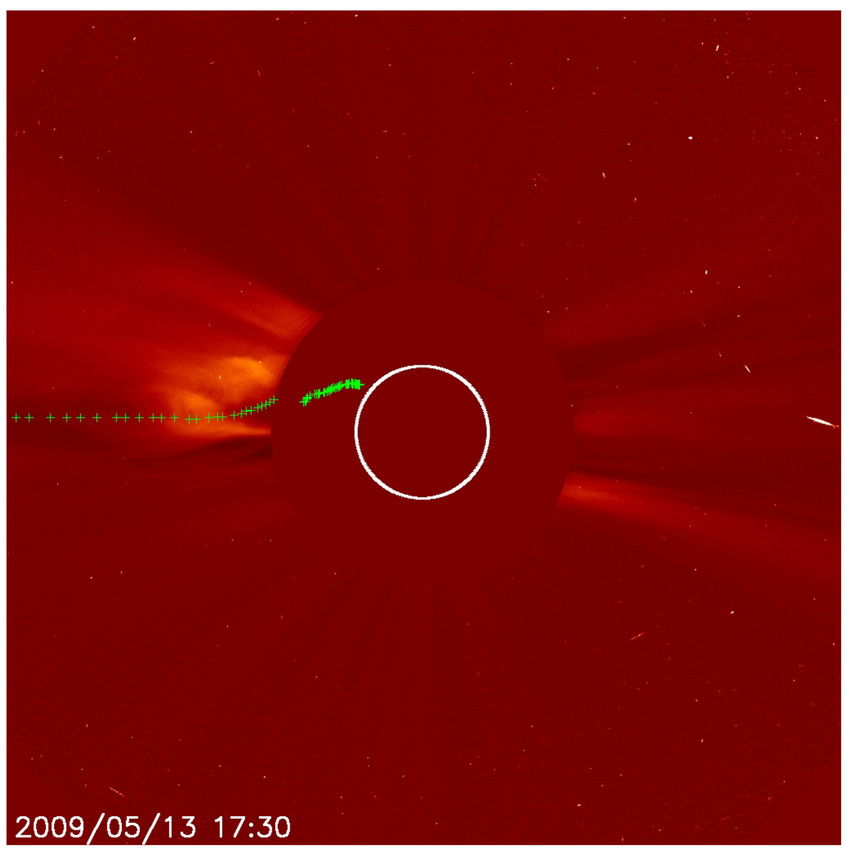


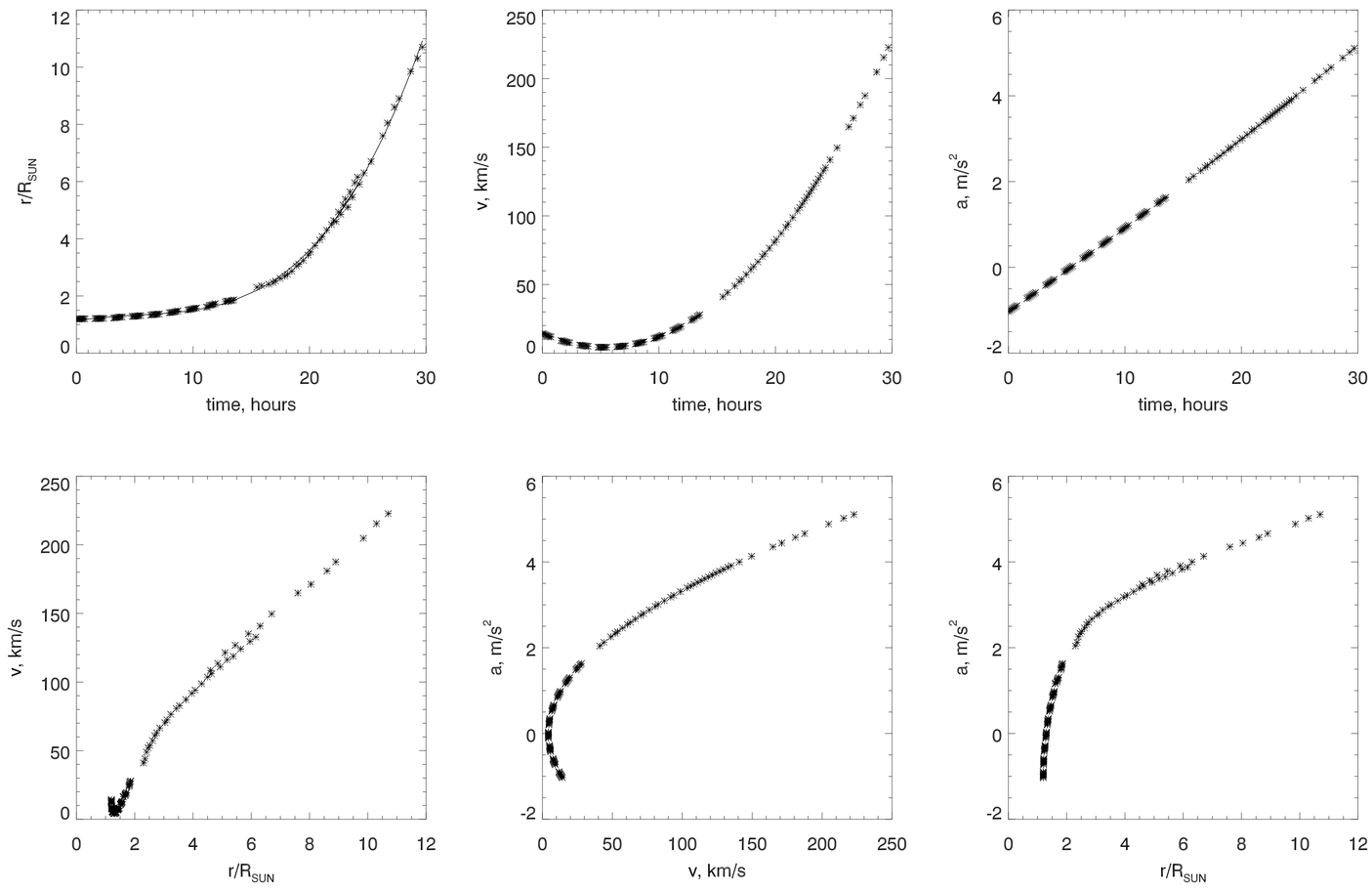


We compared relative positions of CME prominence (observed in 304 Å) and magnetic structure (observed in 171 Å). Figure a – TESIS 171 Å image with the overlayed contour of the prominence. Figure b – TESIS 304 Å image. In order to improve the prominence visibility, we applied an artificial software “moon” to the 304 Å image.

According to the standard CME model the CME prominence should be in the curvature center of the CME magnetic structure (see figure c). But the prominence is below its theoretical position.

Figure c is taken from Lin 2004, *Solar Phys.*, 219, 169-196.





We measured coordinates of the CME front bright edge on the TESIS 171 Å and LASCO C2, C3 images. Green crosses designate CME positions in different moments of time.The trajectory is curved: the CME starts at high latitude, and eventually reaches ecliptic plane.

Using the CME coordinates we calculated the distance from the CME to the solar center (r), CME radial velocity (v), and its acceleration (a). In order to calculate velocity and acceleration we approximated dependence of the radial distance on time with polynom, and then differentiated it over time. The CME acceleration (and therefore its driving force) increases, when the distance from the solar surface increases.