

Dynamic analysis of a coronal mass ejection at distance from 1 to 40 solar radii.

L. Di Lorenzo¹, L.A. Balmaceda^{2,3}, H. Cremades⁴ and C.R. Braga².

¹ INFAP Dr. Giorgio Zgrablich, FCFMyN-UNSL-CONICET, Ejército de los Andes 950, 5700, San Luis, Argentina, ² George Mason University, 4400 University Dr, Fairfax, VA 22030, USA, ³ Goddard Space Flight Center, 8800 Greenbelt Rd, Greenbelt, MD 20771, USA, ⁴ Universidad Tecnológica Nacional -- Facultad Regional Mendoza, CONICET, CEDS, Rodriguez 243, 5500 Mendoza, Argentina

Abstract:

We perform the kinematic characterization of the coronal mass ejection (CME) on April 2, 2019, in a range of heliocentric distances of approximately 5 to 46 solar radii. We use observations from: LASCO-C3 onboard the Solar and Heliospheric Observatory (SOHO) spacecraft, SECCHI-COR2 and HI-1 onboard the Solar Terrestrial Relations Observatory Ahead (STEREO-A) spacecraft and WISPR-I onboard the Parker Solar Probe (PSP) spacecraft. The CME was detected by PSP at a distance of 0.2 AU. From simultaneous observations by LASCO-C3 and COR2-A, we determine the 3D position, velocity and acceleration of the CME. We combine these with measurements from the heliospheric imagers WISPR-I and HI-1 to determine the dynamic evolution of the CME. We analyze the contribution of the intervening internal forces during the CME propagation, in particular the Lorentz force F_{em} , the thermal force F_{th} , and the centrifugal force F_p .

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