

Imprints of Coronal Mass Ejections on Coronal Structures

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Abstract

Coronal mass ejections (CMEs) are, in most cases, associated with the eruption of prominences. They are major disruptions of the coronal magnetic fields and their impact on Space Weather has been recognized for several decades now. However, their imprint on coronal structures has been poorly documented. In this study, we capitalize on the unsurpassed quality of total solar eclipse white light images spanning a solar cycle, to present the different manifestations of the imprint of CMEs, and their corresponding prominence eruptions. Our results show how these imprints (atypical structures) can last for at least several hours. They also show how some of them can be readily mistaken for rapidly expanding coronal structures, akin to coronal holes, or sharply defined rays akin to plumes. The eclipse observations underscore the limitations of our understanding of the origin of large-scale coronal structures and their expansion into interplanetary space.

Key words: Sun, corona, coronal mass ejections (CMEs), filaments, prominences, flares.

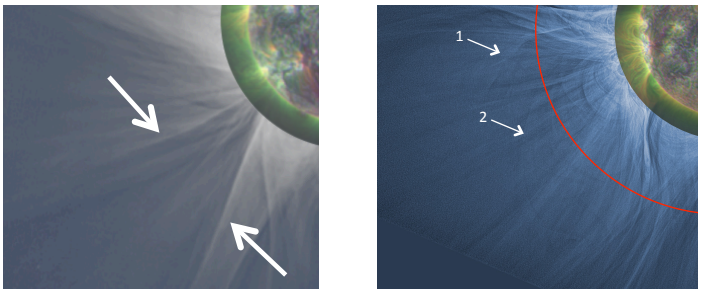


Figure 1: Left: Total solar eclipse white light image taken on 2012 Nov. 13 from Australia at 20:37 UT, with an SDO/AIA color composite superimposed on the eclipsed solar disk. Right: Similar composite for the 2013 November 3 eclipse observed from Gabon at 13:52 UT. The arrows point to the atypical structures analyzed in this study.

Recent Publications

1. Druckmüller, M., Habbal, S. R., **Alzate, N.**, & Emmanouilidis, C. (2017) Tethered Prominence-CME Systems Captured During the 2012 November 13 and 2013 November 3 Total Solar Eclipses, ApJ, 851:L41.
2. **Alzate, N.**, Habbal, S. R., Druckmüller, M., Emmanouilidis, C., & Morgan, H., (2017) Dynamics of Coronal Structures as Imaged During the 2012 and 2013 Total Solar Eclipses, ApJ, 848, 84.
3. **Alzate, N.** & Morgan, H. (2017) Low Coronal Sources of 'Stealth' Coronal Mass Ejections Identified Using New Image Processing Techniques, ApJ, 840, 103.
4. **Alzate, N.** & Morgan, H. (2016) Jets, Coronal 'Puffs' and a Slow Coronal Mass Ejection Caused by Opposite-Polarity Regions Within an Active Region Footpoint, ApJ, 823, 129.

Biography

Nathalia Alzate has a background in Astrophysics. Her work involves the study of solar coronal dynamics by applying new image processing techniques to coronagraph data such as LASCO and STEREO and to EUV data such as AIA, EUVI and SWAP. Total solar eclipse data is also used for the study of the structural changes of the corona.

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