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Reformation of a Quiescent Filament and Persistence of its Magnetic and Thermal Properties

We investigate the reformation of a quiescent filament and its structural and physical properties over two Carrington rotations. Utilizing intensity and magnetic field observations from various ground-based and space-based observatories, we continuously tracked the filament's evolution throughout the observation period. Our analysis reveals that the filament reformed in the same region twice after undergoing every eruption. We assessed its magnetic and thermal properties, including its helicity and the orientation of its barbs. Specifically, we found that the filament exhibited dextral chirality, characterized by right-bearing barbs. Further, our analysis supports the flux rope model for the filament's magnetic structure, while the observed horn-like structures associated with the filament's cavity suggest the presence of a twisted flux rope morphology. Additionally, we estimated the temperature of the filament to be $\log_{10} T = 4.8$ for both instances we observed. The results indicate that the filament has a photospheric origin and reformed from the same underlying filament channel that persisted after a partial eruption.

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Theme

Energetic Phenomena

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