EUV and Radio Observations of an Eruptive Magnetic Flux Rope and Fast CME

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Magnetic flux ropes (MFRs) are believed to be at the heart of solar coronal mass ejections (CMEs). However, observational evidence of eruptive, fast-CME-leading filament-MFR systems has been elusive for those originating from active region. Using multi-passband EUV observations from SDO/AIA on 3 March 2012, we present direct evidence of an eruptive MFR in the low corona that exhibits a hot envelope and a cooler core; the latter is likely the upper part of a filament that undergoes a partial eruption, which is later observed in the upper corona as the coiled kernel of a fast, white-light CME. This MFR-like structure exists more than one hour prior to its eruption, and displays successive stages of dynamical evolution, in which both ideal and non-ideal physical processes may be involved. The timing of the MFR kinematics is well correlated with the energy release of the associated long-duration C1.9 flare. We suggest that the long-duration flare is the result of prolonged energy release associated with the vertical current sheet induced by the erupting MFR and fast CME. The Janky Very Large Array (VLA) was used to obtain dynamic imaging spectroscopic observations of the same event from 1-2 GHz with a spatial resolution of approximately 15", a time resolution of 50 ms, and a spectral resolution of 1 MHz. We present VLA observations of radio bursts associated with energy release resulting from the launch of the fast CME.