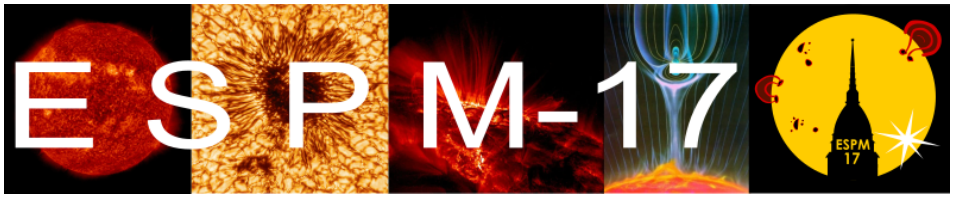

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Fast Downflows Observed during a Polar Crown Filament Eruption

Solar filaments can undergo eruptions and result in the formation of coronal mass ejections (CMEs), which could significantly impact planetary space environments. Observations of eruptions involving polar crown filaments, situated in the polar regions of the Sun, are limited due to their remarkable stability. In this study, we report a polar crown filament eruption, characterized by fast downflows below the filament. The downflows appear instantly after the onset of the filament eruption and persist for approximately 2 hours, exhibiting plane-of-sky (POS) velocities ranging between 92 and 144 km/s. They originate from the leading edge of the filament and no prominent acceleration is observed. Intriguingly, these downflows appear at two distinct sites, symmetrically positioned at the outer sides of the opposite ends of the conjugate flare ribbons. Based on the observations, we propose that the filament might be supported by a magnetic flux rope (MFR), and these downflows possibly occur along the legs of the MFR. The downflows likely result from continuous reconnections between the MFR and the overlying magnetic field structures. We also observed horizontal drifting of the locations of downflows, which might correspond to the MFR's footpoint drifting. This type of downflows can potentially be utilized to track the footpoints of MFRs during eruptions.

Primary author: SUN, Zheng (Peking University)

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