

Explosive Chromospheric Evaporation in a Circular-ribbon Flare

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In this paper, we report our multiwavelength observations of the C4.2 circular-ribbon flare in active region (AR) 12434 on 2015 October 16. The short-lived flare was associated with positive magnetic polarities and a negative polarity inside, as revealed by the photospheric line-of-sight magnetograms. Such magnetic pattern is strongly indicative of a magnetic null point and spine-fan configuration in the corona. The flare was triggered by the eruption of a mini-filament residing in the AR, which produced the inner flare ribbon (IFR) and the southern part of a closed circular flare ribbon (CFR). When the eruptive filament reached the null point, it triggered null point magnetic reconnection with the ambient open field and generated the bright CFR and a blowout jet. Raster observations of the *Interface Region Imaging Spectrograph (IRIS)* show plasma upflow at speed of 35–120 km s⁻¹ in the Fe XXI 1354.09 Å line ($\log T \approx 7.05$) and downflow at speed of 10–60 km s⁻¹ in the Si IV 1393.77 Å line ($\log T \approx 4.8$) at certain locations of the CFR and IFR during the impulsive phase of flare, indicating explosive chromospheric evaporation. Coincidence of the single HXR source at 12–25 keV with the IFR and calculation based on the thick-target model suggest that the explosive evaporation was most probably driven by nonthermal electrons.