Contributed Talk

Splinter HiRes

Small-scale Flux Cancellations Observed with Sunrise II/IMaX

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Magnetic flux cancellation is a dynamic process during which converging opposite polarity elements undergo mutual flux loss, followed by partial or complete disappearance of either or both of the elements from the photosphere. We investigated flux cancellations in a young active region observed with the IMaX magnetograph during the second flight of the balloon-borne observatory Sunrise. We identified eleven events, of which six take place between new emerging flux and pre-existing one, and five happen between previously disconnected features which converge toward each other and cancel out. All these cancellation events have an apparent lifetime less than ten minutes. The disappearing elements are of sub-arcsec spatial scale and reach a peak flux of about 10^{17} Mx. All the events except one exhibit linear polarization signal along the polarity inversion line (PIL) for at least some time during the event. Rise in line core intensity along the PIL is observed as cancellation proceeds between emerging flux and pre-existing one. Also, the Doppler velocity of the disappearing patch gradually switches from blueshift during the emerging phase to redshift towards the end. The Doppler velocity of the cancellations occurring between previously disconnected features is consistently redshifted. Based on these results, we will discuss possible physical scenarios that led to the observed cancellation events.