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Observing three-dimensional magnetic reconnection in solar flares

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The latest expansions to the standard flare model in three dimensions (Aulanier & Dudík, 2019) led to identification of geometries in which field lines reconnect during eruptive flares. One of these geometries is the magnetic ‘ar-rf’ reconnection between the erupting flux rope and surrounding field lines. It occurs at ribbon hooks and leads to drift of flux rope footpoints across the solar surface. We report on observations of signatures of this reconnection geometry in multiple eruptive flares observed by the Atmospheric Imaging Assembly onboard SDO. Apart from drifting of CME footpoints, its presence is manifested e.g., in the conversion of filament strands to flare loops, spatial expansion of a core dimming region, and formation of newly-discovered saddle-shaped arcades of flare loops. We demonstrate how can the evolution and morphology of flare ribbons indicate the nature of processes powering flares and evolution of CMEs.

Student poster?

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