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Numerical Model on Dynamic Plasma Flows above Post-flare Loops

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Fast magnetic reconnection is expected to occur in the current sheet region during the solar eruptions, where outflows near the Alfven speed are predicted from the classic flare models. In observations, the dark, finger-shaped plasma downflows (also referred to as SADs) moving toward the flare arcade are believed as the principal observational evidence of such reconnection-driven outflows. However, they are often much slower than those expected in theories. Here, we report a three-dimensional magneto-hydrodynamics model, and conclude that the SADs are not the reconnection outflows themselves. Instead, they are self-organized structures formed in a turbulent interface region below the flare termination shock where the outflows meet the flare arcade.

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