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**Turbulent Reconnection in Collisionless Mesoscale Layers**

WILLIAM DAUGHTON, ADAM STANIER, ARI LE, Los Alamos National Laboratory — A great deal of progress has been made towards understanding the physics of collisionless reconnection in kinetic-scale current sheets. High-time resolution spacecraft observations in the Earths magnetosphere are in good agreement with fully kinetic simulations. Metaphorically, these kinetic layers are the *hydrogen atom* of reconnection physics, and at this scale our understanding is approaching maturity. However, the applicability to much larger systems remains highly uncertain. For example, the scale of a solar flare is 10 orders of magnitude larger than the electron inertial length, at which the frozen-flux condition is normally broken. Kinetic simulations suggest that large 3D reconnection layers may fragment into a turbulent spectrum of interacting flux ropes, leading to a vast number of kinetic-scale reconnection sites. Such simulations are typically initialized with a highly extended kinetic-scale current sheet, which is not physically realistic, and precludes the possibility of reconnection occurring in much thicker layers. In this work, we present a new approach for driving turbulent reconnection in layers much thicker than the inertial scale, and we characterize the dynamics in these regimes.

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