

Abstract Submitted  
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**Tearing Instability of a Current Sheet Forming by Sheared Incompressible Flow**<sup>1</sup> ELIZABETH TOLMAN, NUNO LOUREIRO, Plasma Science and Fusion Center, Massachusetts Institute of Technology, DMITRI UZDENSKY, Center for Integrated Plasma Studies, University of Colorado, Boulder — Sweet-Parker current sheets are unstable to the tearing mode, suggesting they will not form in physical systems. Understanding magnetic reconnection thus requires study of the stability of a current sheet as it forms. Such formation can occur as a result of sheared, sub-Alfvénic incompressible flows into and along the sheet. This work presents an analysis of how tearing perturbations behave in a current sheet forming under the influence of such flows, beginning with a phase when the growth rate of the tearing mode is small and the perturbations are governed by ideal MHD. Later, after the tearing growth rate becomes significant relative to the time scale of the driving flows, a multiple scale formulation can be used to describe linear tearing as occurring at the stationary rates with time dependence added. Once the tearing mode enters the nonlinear regime, the flows and changing magnetic configuration add a new term and time dependence to the stationary rates. This analysis allows greater understanding of reconnection in evolving systems, and increases confidence in the application of tools developed in time-independent current sheets to changing current sheets.

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