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Fast Reconnection in High-Lundquist-Number Plasmas Due to Secondary Tearing Instabilities YI-MIN HUANG, AMITAVA BHATTACHARJEE, Center for Integrated Computation and Analysis of Reconnection and Turbulence, University of New Hampshire, HONGANG YANG, BARRETT ROGERS, Center for Integrated Computation and Analysis of Reconnection and Turbulence, Dartmouth College — Thin current sheets in systems of large size that exceed a critical value of the Lundquist number are unstable to a super-Alfvénic tearing instability. The scaling of the growth rate of the fastest growing instability with respect to the Lundquist number is shown to follow from the classical dispersion relation for tearing modes. As a result of this instability, the system realizes a nonlinear reconnection rate that appears to be weakly dependent on the Lundquist number, and larger than the Sweet-Parker rate by an order of magnitude (for the range of Lundquist numbers considered). This regime of fast reconnection appears to be realizable in a dynamic and highly unstable thin current sheet, without requiring the current sheet to be turbulent.

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