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The Effect of Shear Flow on the Scaling of 2D Magnetic Reconnection PAUL CASSAK, West Virginia University — Magnetic reconnection experiences a shear flow when there is a net bulk plasma flow in the direction of the reconnecting component of the magnetic field. Such flow is expected to exist in usual conditions at the Earth's magnetosphere (caused by the solar wind at the polar cusps and at the dayside), in sawtooth events in tokamaks (due to poloidal bulk flow which can be set up by plasma drifts), and potentially in solar and astrophysical applications as well. The effect of shear flow on reconnection has been addressed in numerous studies, including a number in recent years, but a quantitative understanding of how shear flow affects the scaling of magnetic reconnection has not been obtained. We begin this effort with a careful study using large-scale Hall magnetohydrodynamics (Hall-MHD) and magnetohydrodynamic (MHD) numerical simulations. Specifically, we address the scaling of the reconnection rate and outflow speed with amplitude of the shear flow.

Paul Cassak
West Virginia University

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