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Evidence for unsteady fast reconnection in a compressible medium[1] DONGWOOK LEE, FAUSTO CATTANEO, University of Chicago, ZORAN MIKIC, Science Applications International Corporation (SAIC), ROBERT ROSNER, Argonne National Lab, ROALD SAGDEEV, University of Maryland, SAMUEL VAINSHTEIN, University of Chicago — We present numerical evidence based on 2.5-dimensional simulations with constant classical resistivity of unsteady reconnection in a compressible medium. The initial configuration consists of a magnetic arcade with a nonzero longitudinal field embedded in a background stratified corona. In the strong compressibility regime the reconnection speed is observed to exceed the Sweet-Parker rate. The crucial ingredient that leads to the fast reconnection rate is the compressive collapse of the current sheet driven by the efficient diffusion of the longitudinal field. The calculation were carried out in a regime in which gravity was dominant in the sense that $F = gl/(C_A C_S) >> 1$ where g is the gravitational acceleration, l is the magnetic scale, and C_A and C_S are the Alfvén and sound speeds respectively. Although the present model is not applicable to the solar case, it describes stars with stronger surface gravity.

[1]The University of Chicago FLASH Center.

Dongwook Lee
University of Chicago

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