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Onset and stagnation of reconnection in 3D geometry J. SEARS, T.P. INTRATOR, T.E. WEBER, D. LIU, D. PULLIAM, Los Alamos National Laboratory, G. LAPENTA, Katholieke Universiteit Leuven, A. LAZARIAN, University of Wisonsin - Madison — The bursty onset of reconnection is partly determined by a balance of macroscopic MHD forces. In a setting of multiple interacting flux ropes, there exist many individual reconnection sites, each X-line being finite in axial extent and thus intrinsically three-dimensional (3D) in structure. The balance between MHD forces and flux pile-up continuously shifts as mutually tangled flux ropes merge or bounce. The spatial scale and thus the rate of reconnection are therefore intimately related to the unsteady dynamics that may become turbulent. In the Reconnection Scaling Experiment (RSX) we study intermittent 3D reconnection along spatially localized x-lines between two or more flux ropes. The threshold of MHD instability which in this case is the kink threshold is varied by modifying the line-tying boundary conditions. For fast inflow speed of approaching ropes, there is merging and magnetic reconnection which is a well known and expected consequence of the 2D coalescence instability. On the other hand, for slower inflow speed the flux ropes bounce. The threshold appears to be the Sweet Parker speed $v_A/S^{1/2}$, where v_A is the Alfven speed and S is the Lundquist number. The flux rope boundary conditions also influence the propagation of the merging interface and the reconnection site along the flux rope axes. (LA-UR 11-03936)

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