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Plasmoid Generation in Driven Compressible Magnetic Reconnection[1] R. SAMTANEY, PPPL, N. LOUREIRO, EURATOM/UKAEA Fusion Assoc., A. SCHEKOCHIHIN, Imperial College, D. UZDENSKY, Princeton Univ., S. COWLEY, EURATOM/UKAEA Fusion Assoc. & Imperial College — High Lundquist number (S) magnetic reconnection (MR) drives the formation of very intense and localized current sheets which, as evidenced both in observations and simulations, fragment and lead to the formation of plasmoids. Plasmoids have been invoked in theories of MR and related phenomena: as a plausible mechanism for accelerating reconnection; to explain the production of energetic electrons during MR; and periodic ejection of plasmoids in star-disk systems may account for the knot-like structures observed in stellar jets. A theoretical understanding of the plasmoid formation mechanism has been lacking. We present high-resolution simulations of driven compressible reconnection in which a new current sheet instability leads to the formation of plasmoid chains. This is a generalization of recent results by Loureiro et al. (PoP 14 100703, 2007) to include the effect of the reconnected field. Nonlinear simulations clearly show the break up of these current sheet into secondary islands. We quantify several characteristics (number of plasmoids etc.), their dependence on S and their effect on reconnection rate. Furthermore, we discuss the setup of boundary conditions for these numerical simulations.

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