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Magnetic Reconnection Onset via Disruption of a Forming Current Sheet by the Plasmoid Instability DMITRI UZDENSKY, Univ. Colorado Boulder, NUNO LOUREIRO, IPFN/IST, Lisbon — The recent realization that thin Sweet-Parker reconnection current sheets are violently unstable to the secondary tearing (plasmoid) instability implies that such current sheets are unlikely to be realized in real natural systems. This suggests that, in order to understand the onset of magnetic reconnection, one needs to consider the growth of the tearing instability in a current layer as it is just being formed. The current sheet formation process thus leads the system directly into plasmoid-dominated reconnection regime. Such an analysis is performed here in the context of resistive MHD for generic time-dependent equilibrium representing a gradually forming current sheet. Both linear and nonlinear (Rutherford and X-point collapse) stages of the evolution of the instability are considered. It is shown that, under most conditions, the longest-wavelength mode dominates, resulting in just one or two big plasmoids produced in the immediate aftermath of current sheet formation.

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