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Topology and Dynamics of Reconnection in 3D Pair Plasma Without Guide Field F. MOLLICA, ENS Cachan, A. BHATTACHARJEE, W. FOX, Center for Integrated Computation and Analysis of Reconnection and Turbulence, University of New Hampshire — We investigate fast reconnection in 3D pair plasma without a guide field using the Particle Simulation Code (PSC), beginning from a Harris sheet with a neutral line, which is a continuum of nulls and is structurally unstable in 3D. The neutral line is shown to break up into a sequence of discrete nulls of the A- and B-type, which are joined by null-null lines that constitute an AB-web, and provide an underlying topological skeleton for 3D reconnection. The current density distribution in such a system is shown to correspond to recent 3D models of “spine reconnection.” The sheet current density is unstable with respect to the kink instability which introduces folding as well as plasmoid instabilities that introduce complex structure formation, while supporting fast time-dependent reconnection.

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