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Plasmoid Chain Dynamics in Three-Dimensional Kinetic Simulations[1] S. MARKIDIS, KTH Royal Institute of Technology, P. HENRI, Université de Nice Sophia Antipolis, CNRS, Observatoire de la Côte d'Azur, G. LAPENTA, Katholieke Universiteit Leuven, A. DIVIN, Swedish Institute of Space Physics, Uppsala, M. GOLDMAN, D. NEWMAN, University of Colorado, E. LAURE, KTH Royal Institute of Technology — We study the dynamics of a plasmoid chain with three dimensional Particle-in-Cell simulations. The evolution of the system with and without a uniform guide field, whose strength is 1/3 the asymptotic magnetic field, is investigated. The plasmoid chain forms by spontaneous magnetic reconnection: the tearing instability rapidly disrupts the initial current sheet generating several small-scale plasmoids, that rapidly grow in size coalescing and kinking. The plasmoid kink is mainly driven by the coalescence process. The presence of guide field strongly influences the evolution of the plasmoid chain. Without a guide field, a main reconnection site dominates and smaller reconnection regions are included in larger ones, leading to an hierarchical structure of the plasmoid-dominated current sheet. On the contrary in presence of a guide field, plasmoids have approximately the same size and the hierarchical structure does not emerge, a strong core magnetic field develops in the center of the plasmoid in the direction of the existing guide field, and bump-on-tail instability, leading to the formation of electron holes, is detected in proximity of the plasmoids.

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