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**Investigating parasitic current formation in MITLs through high-order continuum kinetic simulations**[1] G. V. VOGMAN, J. H. HAMMER, W. A. FARMER, LLNL, U. SHUMLAK, University of Washington — The Z pulsed power facility is designed to deliver more than 20 MA of current to a load through magnetically insulated transmission lines (MITLs), which prevent high voltage arcs. Experimental results show that as much as 10% of the current can be lost due to the unintended formation of low-density plasmas in the MITLs. The configuration of the electric and magnetic fields within the MITL, where the plasma is born, creates conditions in which drift and kinetic instabilities can lead to the formation of parasitic currents. To understand the plasma dynamics that lead to current loss, the MITL configuration is investigated using a high-order continuum kinetic Vlasov-Poisson solver in two spatial and two velocity dimensions. The simulations capture the effects of varying magnetization and yield insights into plasma behavior over the course of current rise and corresponding magnetic field generation. The effects of plasma formation at the cathode versus at the anode are explored in detail.

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