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Quasi-separatrix layer analysis of line-tied tearing modes in kinetic simulation[1] ZACHARY BILLEY, ELLEN ZWEIBEL, University of Wisconsin, Madison, JOHN FINN, WILLIAM DAUGHTON, Los Alamos National Laboratory — It has been shown under linear resistive MHD theory that line-tied field geometry, such as occurs in stellar and accretion disk coronae, can affect the behavior of tearing modes, especially the resistive scaling. The effect is determined by the relation between geometric width, determined by the system length along the guide field, and the tearing layer width. We extend these results into the nonlinear and kinetic regimes by analyzing simulations of a Harris sheet in line-tied slab geometry using the particle in cell code VPIC. In periodic systems, one can trace flux surfaces and magnetic islands by following field lines through many periods of the system. This is not the case with line-tied boundaries. We will instead use field-line integrated diagnostics based on the quasi-separatrix layer theory. A QSL is a thin region where the magnetic field behaves as if reconnecting along a hyperbolic closed field line although no true closed hyperbolic line exists. We will identify reconnecting regions by comparing the potential difference along field lines due to ideal effects with the potential difference due to non-ideal effects. We also calculate the squashing factor for comparison.

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