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Electron scale structures in collisionless magnetic reconnection with multiple reconnection sites SURJALAL SHARMA, NEERAJ JAIN, University of Maryland, College Park, MD-20742 — The early time-dependent phase of collisionless reconnection, which is dominated by electron dynamics, is investigated using electron-magnetohydrodynamic simulations. In EMHD the frozen-in condition of magnetic field breaks down due to electron inertia, which is the dominant non-ideal term in generalized Ohm's law for very thin current sheets (CS) with thicknesses of the order of electron skin depth. This is in contrast with ion-scale current sheets for which divergence of pressure tensor is the dominant term. Simulations initialized with multi-wavelength perturbations lead to reconnection at multiple sites one of which is dominant and others are secondary. The current sheet bifurcation in the outflow regions limits the length of the reconnecting CS which is further reduced by the secondary instabilities growing on the bifurcated CS. The interaction of inflow to the secondary site and outflow from the central dominant site gives rise to the nested structure of quadrupoles. These structures have important implications for multi-spacecraft missions in Earth's magnetotail.

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