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Two and Three Dimensional Electron-scale Structures in Collisionless Magnetic Reconnection A.S. SHARMA, N. JAIN, University of Maryland, College Park — The development of two and three dimensional electron scale structures in collisionless magnetic reconnection is investigated using electron-magnetohydrodynamic simulations. In 2D, the Hall magnetic field develops nested structure of quadrupoles in the presence of multiple reconnection sites due to the interaction of inflow to the secondary site and outflow from the central dominant site. In the outflow regions, the current sheet (CS) gets bifurcated and then filamented limiting the length of the central reconnecting CS while at reconnection sites, triple peak structures form. In 3D, the X and O-points alternate in the third direction every half wavelength of the unstable mode (along the third direction) driving the reconnection. This leads to the formation of a curved X-line as the reconnection takes place in a current sheet which is undulating along the third direction with a period equal to the wavelength of the unstable mode. These structures have important implications for multi-spacecraft missions in Earth's magnetotail.

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