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Intense Electrostatic Field Structures in Low-β Magnetic Reconnection WILLIAM DAUGHTON, JACK SCUDDER, Department of Physics and Astronomy, University of Iowa — Kinetic simulations of low-β reconnection indicate the formation of intense electrostatic fields that start at the x-point and form sheet-like structures that extend outward for large distances along the separatrices. The characteristic thickness of these layers is on the order of the local electron gyroradius and there are significant deviations from charge neutrality within the layer. The resulting electrostatic fields are primarily perpendicular and may exceed the reconnection electric field by a factor of 20. These intense electric fields are sufficient to demagnetize electrons across the layer and induce significant off- diagonal components in the electron pressure tensor. Many of these basic features are consistent with recent high-time resolution observations from the Polar satellite in the vicinity of suspected reconnection sites. In this work, we employ a combination of Vlasov theory in conjunction with large-scale kinetic simulations, to examine the formation mechanism and role these structures may play in setting the overall dissipation rate and/or accelerating particles.

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