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3-D Particle-in-cell simulations of the sawtooth crash J.F. DRAKE, MICHAEL SWISDAK, University of Maryland — The results of 3-D particle-in-cell simulations of reconnection in system with an ambient pressure gradient are presented that explore whether drift-wave turbulence can facilitate energy loss from the core of tokamaks during the sawtooth crash. During reconnection leading to the sawtooth crash, the ambient pressure gradient across the magnetic x-line becomes very steep as hot plasma from the core convects into the colder q=1 surface. Gradients scale lengths of the order of the ion sound Larmor radius develop in 2-D simulations. The dominant instabilities in such sharp gradients are associated with drift waves rather than ballooning modes. In 3-D simulations we are exploring the development of the steep gradients in the vicinity of the x-line and magnetic separatrices as reconnection develops, the range of unstable drift waves that are driven unstable as the local pressure gradient increases and their role in facilitating the expulsion of the hot plasma core during the crash.

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