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A Model for Incomplete Reconnection in Sawtooth Crashes MATTHEW BEIDLER, PAUL CASSAK, West Virginia University — Large sawteeth are deleterious for fusion because they spoil core confinement. The Kadomtsev model fails to explain why the sawtooth cycle ends before all available magnetic flux is reconnected, i.e., the reconnection is incomplete. We present a model for incomplete, or partial, reconnection in sawtooth crashes. When the high pressure core and low pressure edge of a tokamak convect toward the m=n=1 reconnection site due to self-consistent dynamics of magnetic reconnection, the pressure gradient at the reconnected if the diamagnetic drift speed at the reconnection site exceeds a threshold, which may explain observations of incomplete reconnection. Proof-ofprinciple two-fluid simulations confirm this basic picture. Predictions of the model compare favorably to data from the Mega Ampere Spherical Tokamak. Applications to transport modeling of sawteeth are discussed. The results should apply across tokamaks, including ITER.

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