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**Session BP1 - Poster Session I.**

*POSTER session, Monday morning, November 15  
Room Exhibit Hall A, SCC*

**[BP1.072] Nonlinear  $m=1$  modes: Hall MHD Versus Four-Field Studies**

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We report comparative nonlinear studies of the  $m=1$  sawtooth instability using the Magnetic Reconnection Code (MRC). The MRC can operate in cylindrical/toroidal geometry, supports block-structured adaptive mesh refinement as well as non-uniform radial grids, and can be used to integrate the full Hall MHD as well as reduced four-field equations. Using the four-field version of the MRC, we have confirmed the near-explosive nonlinear growth first reported by Aydemir. In the four-field model, the near-explosive phase coincides with the shrinking of an elongated poloidal current sheet to an X-point-like structure. However, using similar initial conditions, this explosive phase has yet to be observed in the full Hall MHD version of the MRC when resistivity is the mechanism for breaking field lines. The Hall MHD simulations do show a linear instability, but one that is stabilized nonlinearly. We will present results comparing in detail the effects of resistivity, electron inertia, the Hall current and electron pressure gradient terms in the two models.

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