

Abstract Submitted
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Two-fluid studies including pressure tensor effects of current sheet instabilities and reconnection in the magnetotail¹ JONATHAN NG, Princeton University, A HAKIM, PPPL, A BHATTACHARJEE, Princeton University, PPPL — The ballooning instability is a possible mechanism leading to the triggering of magnetic substorms and this is supported by observations of fluctuations in the ballooning frequency range in the Earth's magnetotail [1,2]. Kinetic and MHD studies of generalised current sheets have shown how these instabilities can develop and affect dynamics of substorms by driving flows and causing the formation of plasmoids [3, 4]. Using a two-fluid model which includes pressure tensor effects, we first perform a study of current sheet instabilities and show that the ion pressure tensor is necessary for agreement with kinetic models. We then perform 3D simulations of magnetotail configurations to study the coupling between the ballooning instability and magnetic reconnection and the possible effects on substorm onset. Qualitative comparisons with THEMIS and MMS observations will be made. [1] L.-J. Chen et al. GRL (2003) [2] E. A. Panov et al. JGR (2012) [3] P. L. Pritchett F. V. Coroniti JGR (2013) [4] P. Zhu et al. Phys. Plasmas (2017)

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