Abstract Submitted
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Visco-resistive plasmoid instability in Sweet-Parker current sheets DANIELA GRASSO, Istituto dei Sistemi Complessi - CNR, LUCA COMISSO[1], Princeton University — The linear analysis by Loureiro et al. [1] is generalized to investigate the plasmoid instability in visco-resistive Sweet-Parker sheets [2]. We cover both the linear and nonlinear growth of the plasmoids. The linear growth rate and the wavenumber scale as $S^{1/4}(1+P_m)^{-5/8}$ and $S^{3/8}(1+P_m)^{-3/16}$ with respect to the Lundquist number S and the magnetic Prandtl number P_m. The growth of the plasmoids slows down from an exponential growth to an algebraic growth when they enter into the nonlinear regime. The time-scale of the nonlinear growth of the plasmoids is found to be $\tau_{NL} \sim S^{-3/16}(1+P_m)^{19/32}\tau_{A,L}$. We also discuss how the plasmoid instability can enable fast magnetic reconnection [3] in visco-resistive plasmas [4]. In this regime, the global reconnection rate is shown to be $\langle d\psi/dt|_X\rangle \approx 0.01 v_{A,u}B_u(1+P_m)^{-1/2}$ [2]. [1] N.F. Loureiro, A.A. Schekochihin and S.C. Cowley, Phys. Plasmas 14, 100703 (2007). [2] L. Comisso and D. Grasso, Phys. Plasmas 23, 032111 (2016) [3] A. Bhattacharjee, Y.-M. Huang, H. Yang and B. Rogers, Phys. Plasmas 16, 112102 (2009). [4] L. Comisso, D. Grasso and F.L. Waelbroeck, Phys. Plasmas 22, 042109 (2015).

[1]The same author will present another poster in a closely related topic: "Generalized Plasmoid Instability in Time Evolving Current Sheets". Hence, we request the committee to ensure that these 2 posters are placed alongside each other.

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