Abstract Submitted
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Sub-ion scale plasmoids during collisionless reconnection on TREX JOSEPH OLSON, JAN EGEDAL, RACHEL MYERS, SAM GREESS, MIKE CLARK, JOHN WALLACE, CARY FOREST, University of Wisconsin-Madison, WISCONSIN PLASMA ASTROPHYSICS LABORATORY COLLABORATION — The Terrestrial Reconnection Experiment (TREX), operating at the Wisconsin Plasma Astrophysics Laboratory[1], is able to explore a collisionless regime inaccessible to previous reconnection experiments. To date, TREX has already achieved Lundquist numbers up to 10^4 where kinetic effects, such as electron pressure anisotropy, become important to the reconnection dynamics[2]. During a recent run campaign in this collisionless regime, the spontaneous formation of magnetic islands (plasmoids) inside the ion diffusion region was observed. It is known that long current layers are susceptible to tearing, leading to the formation of plasmoids, and that these plasmoids have strong effects on the reconnection rate and particle energization. However, contrary to theoretical and numerical predictions, the TREX experiments show that the plasmoid instability is active even when the current layer is less than one d_i long[3]. Analysis of these events shows that smaller plasmoids occur at a higher rate than larger ones, suggesting that magnetic islands could be seeded in plasmas more effectively than previously thought.

[1]C.B. Forest *et al.*, JPP (2015)
[2]A. Le *et al.*, JPP (2015)
[3]J. Olson *et al.*, PRL (2016)

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