Abstract Submitted
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Cross-discipline study of the dynamics and energetics of the magnetic reconnection both in laboratory and space plasmas[1] MASAAKI YAMADA, HANTAO JI, Princeton Plasma Physics Laboratory, MIKE PALUSZEK, Princeton Satellite Systems, YEVGENY RAITSES, JACOB SIMMONDS, JONG-SOO YOO, Princeton Plasma Physics Laboratory — Despite enormous differences in the size of the reconnection layer (by 10^6), remarkably self-similar characteristics have been observed in both laboratory and magnetosphere plasmas. The key dynamics were comparatively studied with data from laboratory (MRX) and space (MMS) in the context of two-fluid physics, aided by numerical simulations [1]. A large potential well is observed within the reconnection plane with ions accelerated by the E field toward the exhaust. It was also found in MRX and numerical simulations that a half of inflow magnetic energy is converted to ions and electrons in the reconnection layer. While this measurement is yet to be verified in the magnetosphere, a concept of a super-cluster cubesat system has been proposed, which is based on a 2D (11×11) or 3D ($5 \times 5 \times 5$) satellite grid in Earths magnetosphere [2]. With the key two-fluid physics occurring in the scale length of 1-200 km, optimal distance between adjacent satellites for measuring the structure of reconnection layer is 2-50 km, such that the total grid size can be 20-500 km. This system should directly contribute to the understanding the global dynamics. Overall program scope will be presented. [1] M. Yamada, et al, Nature Comms, (2018) [2] M. Yamada, et al, Proc. COSPAR (2017)

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