

Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Understanding the dynamics and the energetics of magnetic reconnection in laboratory and space plasmas¹ MASA AKI YAMADA, JONG-SOO YOO, HANTAO JI, JON JARA-ALMOTE, WILL FOX, RUSSELL KULSRUD, Princeton Plasma Physics Laboratory, Princeton University — We will present recent findings in the research of asymmetric and symmetric magnetic reconnection both in laboratory and space plasmas [1]. In spite of the huge difference (10^6 - 10^7) in physical scales, we find remarkable commonality between the properties and the dynamics of the reconnection layer in laboratory and space plasmas. The recent significant progress in diagnostics in the both fields made us possible to directly compare the observed physics processes. The experimental results on the energy conversion and partitioning are discussed and compared with quantitative estimates based on two-fluid analysis as well as space observations. We observed notable similarity in the energy partitioning in the reconnection layer of the MRX and space observations [1,2]. Furthermore, we have observed whistler waves and lower-hybrid frequency fluctuations at the lower density side of asymmetric reconnection layer on MRX [2]. The experimental results are remarkably consistent with the recent space observations from MMS [3]. We directly compare the data from the MRX and the recent MMS observations which show very similar power spectra. Ref.: [1] M. Yamada, et al, PoP 23, 055402 (2016), [2] J. Yoo et al, Submitted to J. G.R. (2017), [3] L. J. Chen et al, This conf.

¹Supported by OFES, Dept. Energy

Masaaki Yamada
Princeton Plasma Physics Laboratory, Princeton University

Date submitted: 13 Jul 2017

Electronic form version 1.4