Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Experimental Investigation of Magnetic Reconnection in Weakly Ionized Plasmas JONATHAN JARA-ALMONTE, HANTAO JI, JONGSOO YOO, MASAAKI YAMADA, WILL FOX, Princeton Plasma Physics Laboratory — Magnetic reconnection is a fundamental process in magnetized plasmas wherein stored magnetic energy is rapidly released. While commonly studied in fully ionized plasmas, many important systems (e.g., the chromosphere or interstellar medium) are weakly ionized, which can significantly modify reconnection physics. Recent IRIS observations have enabled detailed studies of chromospheric reconnection, highlighting its in partially ionized systems [1]. Previous experiments on the Magnetic Reconnection Experiment have qualitatively shown that reconnection is slow in partially ionized systems, in contrast to theoretical predictions, although the underlying physics is unclear [2]. Here, new experiments are performed to examine the detailed role of neutrals. An in-situ filterscope has been developed to simultaneously measure Helium line emission at 668, 706, and 728 nm from a localized, 1 cm^3 volume with high time-resolution. Collisional radiative modeling is used to determine the neutral density, as well as the electron density and temperature. By measuring the neutral density, the detailed neutral-plasma coupling during reconnection is studied in detail. [1] De Pontieu, Bart, et al. Solar Physics 289.7 (2014) [2] Lawrence, Eric E., et al. Physical review letters 110.1 (2013)

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Date submitted: 14 Jul 2017 Electronic form version 1.4