Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

**Thomson scattering measurements of particle drift velocities in a reconnection current sheet**[1] LEE SUTTLE, J.D. HARE, J.W.D. HALLIDAY, D. RUSSELL, E. TUBMAN, V. VALENZUELA-VILLASECA, S.V. LEBEDEV, Imperial College London — The release of stored magnetic energy through magnetic reconnection often leads to imbalanced particle energy distributions, however the mechanisms producing nonequipartion are poorly understood. Thomson scattering measurements in pulsed-power experiments of driven, collisional magnetic reconnection have shown strong heating of ions, with Ti>>Te, much greater than can be accounted for by classical shock, resistive and viscous heating mechanisms [1]. We present newly performed measurements of the particle drift velocities in the direction of the reconnection electric field. These reveal ions acting as charge carriers for a significant fraction of the reconnection current, suggesting that the electrons remain magnetized to the reconnected field lines. We also observe relative electron-ion velocities exceeding the sound speed of the plasma, which could to lead to ion acoustic instability responsible for the anomalous heating. We assess the scattered signal strength for consistency with this hypothesis. [1] Suttle et al., PRL 116, 225001 (2016)

[1]Experimental work carried out at the MAGPIE pulsed-power generator, Imperial College London. Supported by DOE Cooperative Agreement DE-NA0003764.

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Date submitted: 02 Jul 2019 Electronic form version 1.4