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Active Perturbation of the Reconnecting Current Sheet in MRX
SETH DORFMAN, HANTAO JI, MASAOKI YAMADA, YANG REN, STEFAN GERHARDT, Princeton Plasma Physics Laboratory — Electromagnetic fluctuations are thought to provide anomalous resistivity, speeding up the magnetic reconnection process¹. Such fluctuations have been previously observed in MRX in a broad spectrum up to the lower hybrid frequency². In order to characterize these fluctuations in detail, a magnetic dipole of ~ 1 mm radius is used to produce a field at a single frequency in the reconnecting current sheet of the Magnetic Reconnection Experiment (MRX). The field from this active probe is picked up by a three component fluctuation probe a few centimeters upstream or downstream with respect to electron flow within the current layer. With detection downstream, the signal is enhanced within the current sheet. By contrast, the signal detected upstream within the layer is often reduced below the vacuum value. Ongoing experiments and analysis will more fully explore the propagation characteristics and their implications on the reconnection process; this includes use of a ~ 1 cm radius coil that may better couple to plasma modes³.

¹H. Ji, et al., Phys. Rev. Lett. **80**, 3256 (1998).

²H. Ji, et al., Phys. Rev. Lett. **92**, 115001 (2004).

³C.L. Rousculp, et al., Phys. Plasmas. **2**, 4083 (1995).

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