Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Fluctuation dynamics in reconnecting current sheets ADRIAN VON STECHOW, OLAF GRULKE, Max Planck Institute for Plasma Physics, Greifswald, HANTAO JI, MASAAKI YAMADA, Princeton Plasma Physics Laboratory, THOMAS KLINGER, Max Planck Institute for Plasma Physics, Greifswald —
During magnetic reconnection, a highly localized current sheet forms at the boundary between opposed magnetic fields. Its steep perpendicular gradients and fast parallel drifts can give rise to a range of instabilities which can contribute to the overall reconnection dynamics. In two complementary laboratory reconnection experiments, MRX (PPPL, Princeton) and VINETA.II (IPP, Greifswald, Germany), magnetic fluctuations are observed within the current sheet. Despite the large differences in geometries (toroidal vs. linear), plasma parameters (high vs. low beta) and magnetic configuration (low vs. high magnetic guide field), similar broadband fluctuation characteristics are observed in both experiments. These are identified as Whistler-like fluctuations in the lower hybrid frequency range that propagate along the current sheet in the electron drift direction. They are intrinsic to the localized current sheet and largely independent of the slower reconnection dynamics. This contribution characterizes these magnetic fluctuations within the wide parameter range accessible by both experiments. Specifically, the fluctuation spectra and wave dispersion are characterized with respect to the magnetic topology and plasma parameters of the reconnecting current sheet.

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Date submitted: 24 Jul 2015 Electronic form version 1.4