Abstract Submitted
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Studies of waves during asymmetric reconnection in laboratory and space[1] JONGSOO YOO, EVAN YERGER, JONATHAN JARA-ALMONTE, MASAAKI YAMADA, HANTAO JI, WILL FOX, Princeton Plasma Phys Lab, LI-JEN CHEN, University of Maryland, College Park — Wave activities during asymmetric reconnection have been studied by directly comparing data from the Magnetic Reconnection Experiment (MRX) with data from the Magnetospheric Multiscale (MMS). The power spectrum near separatrices on the low-density (magnetosphere) side shows remarkable similarities. Regarding fluctuations driven by lower hybrid drift instabilities (LHDI), it shows broad spectrum with the energy concentrated mostly below the lower-hybrid frequency. The free energy source of LHDI is the diamagnetic current by the strong density gradient near the separatrix region. The whistler waves show a power spectrum concentrated around half of the electron cyclotron frequency ($0.5f_{ce}$). In MMS, they propagate mostly parallel to the field line toward the X-line with a relatively high phase velocity ($\sim 5 \times 10^7$ m/s). The whistler waves are also observed in the exhaust region and near the electron diffusion region (EDR). However, they become intermittent and with the frequency higher than $0.5f_{ce}$ in the exhaust region and higher than $0.5f_{ce}$ near the EDR. The dominant wave vector satisfies $kd_e \sim 1$ for all cases. Possible excitation mechanisms for the observed whistler waves are discussed.

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