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Collisional Effects on the Lower Hybrid Drift Wave Inside the Reconnecting Current Sheet of a Laboratory Plasma[1] JONGSOO YOO, Princeton Plasma Physics Laboratory, YIBO HU, Soochow University, JEONG-YOUNG JI, Utah State Univeristy, HANTAO JI, Princeton University, JONATHAN JARA-ALMONTE, SAYAK BOSE, AARON GOODMAN, MASAAKI YAMADA, ANDREW ALT, WILL FOX, Princeton Plasma Physics Laboratory — Lower hybrid drift waves (LHDWs) have been observed near the electron region of the Magnetic Reconnection Experiment (MRX), where finite Coulomb collisions exist. To address possible collisional effects on LHDW, we have developed a theoretical framework, which is based on a local linear model and electron fluid equations. Unlike the previous model for collisionless plasma [1], we have modified the expression for electron heat flux and added the effects due to heat generation by collisions with known fluid closures [2,3]. In addition, the first-order perpendicular temperature is included. Preliminary results show that collisional effects with typical MRX parameters are negligible, although the growth rate decreases. For parameters measured in MRX during high guide field reconnection, the quasi electrostatic LHDW propagating almost perpendicular to the magnetic field is unstable. This quasi electrostatic LHDW is capable of generating density fluctuations correlated with fluctuations in the electric field, potentially leading to anomalous electron heating. [1] J. Yoo et al. Lower hybrid drift waves during guide field reconnection, submitted. [2] J. Ji and E. D. Held, phys. plasmas 20, 042114 (2013). [3] J. Ji and I. Joseph, phys. plasmas 25, 032117 (2018).

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