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New results on the perpendicularly propagating electromagnetic lower hybrid drift instability (LHDI)[1] YANSONG WANG, RUSSELL KULSRUD, HANTAO JI, Princeton University — Motivated by the observation of the magnetic fluctuations in the current layer of the MRX, we developed an *oblique* LHDI theory [1]. Applying this local theory to the Harris sheet, we found that this local mode is strongly unstable. However, it has such a large group velocity that it propagates out of the unstable region before it grows significantly. In fact, the larger the drift velocity, the more narrow the unstable region, (because the current thickness decreases). Thus, the oblique mode does not seem to be responsible for the observed fluctuations, or any enhanced resistivity. Therefore, we have concentrated on *perpendicular* propagation modes. We have found an unstable mode with a very small group velocity in the gradient direction. this mode has a substantial growth rate and a smaller group velocity so it stays for a longer time in the unstable region. This may be the desired mode. Curiously, it is not made unstable directly by ion Landau damping, but is made unstable by the out-of-phase correction to the perturbed ion density due to the $\delta \mathbf{V} \cdot \nabla n_0$ term.

[1] H. Ji, R. Kulsrud, W. Fox, and M. Yamada, JGR 110, A08212 (2005).

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