Lower hybrid waves at the magnetosheath separatrix region

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Lower hybrid waves are investigated at the magnetosheath separatrix region in asymmetric guide-field reconnection at Earth’s magnetopause by using MMS observations. These waves are found in a limited region, depending on the density gradient across the separatrix, and they are driven by the lower hybrid drift instability. Properties of these waves are presented: (1) the waves propagate towards the x-line due to the out-of-plane magnetic field, consistent with the electron drift direction; (2) the wave potential is about 20% of the electron temperature. These drift waves effectively produce cross-field particle diffusion, enabling the entry of magnetosheath electrons into the exhaust region.

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