Anomalous resistivity due to nonlinear lower-hybrid drift waves.

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A general Vlasov-Maxwell theory is applied to estimate anomalous collision rate and resistivity due to unstable waves in collisionless plasma. In particular, we consider the role of lower-hybrid drift waves, which are very common in Earth magnetosphere, in producing anomalous resistivity in the vicinity of thin current sheets. Self-consistent Vlasov-code simulations of current sheets allow us to follow the evolution of the waves and calculate the anomalous collision rate due to electrostatic and electromagnetic fluctuations. It appears that electrostatic and electromagnetic contributions to anomalous collision rate are practically equal, of the order of lower-hybrid frequency. Anomalous resistivity calculated from these collision rates can be quite significant. Results of Vlasov-code simulations are compared to Cluster spacecraft measurements near Earth magnetopause.