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Small scale instabilities and anomalous electron current in Hall plasmas A. SMOLYAKOV, I. ROMADANOV, W. FRIAS, University of Saskatchewan, J. CARLSSON, I. KAGANOVICH, Y. RAITSES, Princeton Plasma Physics Laboratory — Small scale instabilities in Hall plasmas with ExB drift of magnetized electrons and non-magnetized ions are investigated analytically and in numerical simulations. Interrelation of various branches such as collisionless Simon-Hoh, low hybrid and electron cyclotron modes are investigated in local and nonlocal regimes. It is shown that long wavelength Simon-Hoh instability driven by plasma gradients smoothly connects to the low hybrid instability with a cut-off at the wavelength of the electron Larmor radius. It is shown that the electron-neutral collisions are destabilizing at small scale but reduce the growth rate at moderate values of the wavelengths. The electron cyclotron mode is compared against the low hybrid mode operating in the same range of the frequencies and wave vectors. Relative contribution of various modes into electron transport is studied in nonlinear fluid and Particle-in-Cell simulations.

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