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Energy transfer via Weibel and two-stream instabilities in two-temperature electron-ion plasmas JAEHONG PARK, ERIC BLACKMAN, XI-ANGLONG KONG, CHUANG REN, University of Rochester — Whether an efficient collisionless temperature equilibration mechanism exists for a two-temperature ion-electron plasma, with $T_i > T_e$, is important for understanding astrophysical phenomena such as radiatively inefficient accretion flows and relativistic collisionless shocks in Gamma-ray bursts. Here we study whether the two-stream and Weibel instabilities driven by proton counter-streaming and/or temperature anisotropy can be such a mechanism. Analysis and PIC simulations show that the Weibel instability induces only a weak electro-ion coupling in either non-magnetized [Ren, Blackman, and Fong, *Phys. Plasmas*, 14:012901 (2007)] or magnetized plasmas. The two-stream instability is found to be more effective than the Weibel instability for the electron-ion coupling. This work is supported by the U.S. Department of Energy under Grant Nos. DE-FC02-04ER54789 and DE-FG02-06ER54879.

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