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Kinetic Self-Organization of Microinstabilities in Astrophysical and in Laboratory Plasmas GIOVANNI LAPENTA, Los Alamos National Laboratory — Microinstabilities can be considered as effective collisions. The small scale electromagnetic fluctuations due to microinstabilties can be considered as collisions on the particles, leading to a similar point-like and instantaneous-like change in the particle momentum. This paradigm, the anomalous transport paradigm, requires us to derive theories that can predict the correct transport parameters (particularly the anomalous viscosity and anomalous resistivity) from the properties of the microinstabilties. Our recent work [1-3] has shown that another possible effect of microinstabilties is to lead to a direct macroscopic change in the equilibrium by affecting the plasma flow, temperature anisotropy and current profile on a macroscopic level. Our previous work has focused on space and astrophysical systems. But similar effects can be considered for experimental plasmas. A particularly intriguing possible analogy is with zonal flows and "angular momentum generation" believed to be happening in accretion disks in astrophysical systems [4] and with the "spontaneous toroidal rotation" of axisymmetric plasmas in fusion devices such as Jet and Alcator C-Mod [5]. [1] G. Lapenta, J.U. Brackbill, W.S. Daughton, Phys. Plasmas, 10, 1577 (2003). [2] W. Daughton, G. Lapenta, P. Ricci, Phys. Rev. Lett., 93, 105004, 2004 [3] P. Ricci, J.U. Brackbill, W.S. Daughton, G. Lapenta, Phys. Plasmas, 11, 4102, 2004. [4] B. Coppi 2002 Nucl. Fusion 42 1-4 [5] E. S. Marmar, et al., Fusion Energy 2002 (IAEA, Vienna) Paper OV/4-1

Giovanni Lapenta

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