Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

**Compressional Fluctuations in Pair-Plasma Microturbulence**[1]
M.J. PUESCHEL, University of Texas at Austin, R.D. SYDORA, University of Alberta, P.W. TERRY, University of Wisconsin-Madison — Pair plasmas have received renewed interest since their relevance to astrophysical objects has been supplemented by recent as well as planned experiments. One instability driven by pressure gradients in magnetized plasmas that also applies to pair plasmas is the Gradient-driven Drift Coupling (GDC) mode, which relies on the interplay between electrostatic and parallel magnetic fluctuations. By means of electromagnetic full-$f$, fully kinetic simulations, it is shown that, while exact pressure balance of the equilibrium stabilizes this mode, realignment of the background magnetic field occurs on a much slower time scale than that by which the GDC instability is able to excite turbulence and thereby flattens the driving pressure gradient. Thus, systems not initially in balance can exhibit GDC turbulence, and systems in flux but maintaining the pressure gradient may sustain it for longer times, with consequences for an array of physical systems. Laser-generated electron-positron plasmas moving through a magnetic field are likely unable to achieve force balance, and inherent density gradients will cause fluctuations and fluxes to appear and influence plasma dynamics on short time scales.

[1]Supported by DOE grants DE-SC0018048 and DE-FG02-04ER-54742.

M.J. Pueschel
University of Texas at Austin

Date submitted: 03 Jul 2019 Electronic form version 1.4