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Simulations of Tokamak Edge Turbulence Including Self-Consistent Zonal Flows* BRUCE COHEN, MAXIM UMANSKY, Lawrence Livermore National Laboratory — Progress on simulations of electromagnetic drift-resistive ballooning turbulence in the tokamak edge is summarized in this mini-conference talk. A more detailed report on this work is presented in a poster at this conference. This work extends our previous work [1] to include self-consistent zonal flows and their effects. The previous work [1] addressed the simulation of L-mode tokamak edge turbulence using the turbulence code BOUT. The calculations used realistic single-null geometry and plasma parameters of the DIII-D tokamak and produced fluctuation amplitudes, fluctuation spectra, and particle and thermal fluxes that compare favorably to experimental data. In [1] the effect of sheared ExB poloidal rotation is included with an imposed static radial electric field fitted to experimental data. In the new work here we include the radial electric field self-consistently driven by the microturbulence, which contributes to the sheared ExB poloidal rotation (zonal flow generation). We present simulations with/without zonal flows for both cylindrical geometry, as in the UCLA Large Plasma Device, and for the DIII-D tokamak L-mode cases in [1] to quantify the influence of self-consistent zonal flows on the microturbulence and the concomitant transport. *This work was performed under the auspices of the U.S. Department of Energy under contract DE-AC52-07NA27344 at the Lawrence Livermore National Laboratory.

[1] B. I. Cohen et al., Phys. Plasmas **20**, 055906 (2013)

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