Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

**Morphological Properties of Large-Scale Motions Remain Self-Similar Across Thermal Regimes** SCOTT SALESKY, University of Oklahoma, WILLIAM ANDERSON, University of Texas at Dallas — Studies of high-Re wall turbulence have revealed the existence of large scale motions (LSMs) that populate the logarithmic layer and modulate the amplitude of small-scale turbulent fluctuations near the wall. In flows with unstable thermal stratification, conventional wisdom states that these structures become shorter in the streamwise direction and steepen with increasing buoyancy forcing. Using a suite of large eddy simulations of wall-bounded turbulent shear flows with increasingly unstable thermal stratification, we demonstrate from instantaneous flow visualizations and conditional averages that morphological properties of these structures remain self-similar with increasing unstable thermal stratification. As thermal stratification increases, the downstream edge of an LSM begins to detach from the wall, leaving a wedge of cool, high-momentum fluid beneath. A simple model is developed for the inclination angle of LSMs with increasing thermal instability; atmospheric surface layer observations from the Advection Horizontal Array Turbulence Study (AHATS) are found to be in good agreement with the predicted inclination angles.

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Date submitted: 30 Jul 2019 Electronic form version 1.4