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Coherent Structures in a Thermally Stable Boundary Layer
OWEN WILLIAMS, Princeton University, SEAN BAILEY, University of Kentucky, ALEXANDER SMITS, Princeton University — Experiments were conducted in thermally stable boundary layers to examine the reduction in heat and momentum fluxes, the effects of buoyancy on the turbulence statistics, and the interaction between turbulent coherent structures and internal gravity waves. This experiment was conducted in a 5 m long, 1.2 m by 0.6 cross-section, open-return wind tunnel. The measurements were conducted on the surface of the tunnel, which is heated using strips of heating tape. The plate was isothermal, and a wide range of stabilities were investigated, with Richardson numbers ranging from 0 to 0.5, covering both the weakly and strongly stable regimes. Additionally, it was attempted to identify significant features of the turbulence that could be used to identify clearly delineating features between weak and strong regimes. This work was made possible by support received through Princeton University's Grand Challenges-Energy program, supported by the Thomas and Stacey Siebel Foundation.

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