Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Reynolds stress spectra in pipes and boundary layers up to $Re_\tau \approx 10000$[1] SPENCER ZIMMERMAN, JIMMY PHILIP, JOSEPH KLEWICKI, University of Melbourne — Turbulent pipe flows and zero-pressure-gradient boundary layers (BLs) are frequently compared with the goal of elucidating the role of boundary conditions on turbulent wall flows. Since at least the early study by Schubauer (J. Appl. Phys., **25** (2), 1954, pp. 188–196), differences in the Reynolds stress (RS) profiles of the two flows have been described as resulting primarily from the turbulent/non-turbulent intermittency of the boundary layer. More recently, however, a number of researchers have shown differences in the streamwise velocity variance contributions per scale between the two flows even below the intermittent range. Despite these differences, Monty *et al.* (J. Fluid Mech., **632**, 2009, pp. 431–442) showed that the streamwise variance profiles of the two flows match over most of the domain at matched friction Reynolds number. Extending this work, Zimmerman *et al.* (J. Fluid Mech., **869**, 2019, pp. 182–213) showed experimental evidence that differences in the wall-normal and spanwise RS profiles can extend to within the log-layer. Here, we use the same experimental dataset to discuss features of the spectra common to both flows as well as the scales and wall-positions at which systematic differences are observed.

[1]Australian Research Council

Spencer Zimmerman
University of Melbourne

Date submitted: 01 Aug 2019 Electronic form version 1.4