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Performance of hot-wire probes designed to simultaneously measure three velocity components RACHEL EBNER, CALEB MORRILL-WINTER, University of New Hampshire, RIO BAIDYA, University of Melbourne, PETAR VUKOSLAVCEVIC, University of Montenegro, JOSEPH KLEWICKI, University of New Hampshire and University of Melbourne, JAMES WALLACE, University of Maryland, NICHOLAS HUTCHINS, University of Melbourne —
Vukoslavcevic (*Exp. in Fluids* **53**, 2012) recently used highly resolved channel flow DNS at low Reynolds number to investigate a number of hot-wire probe configurations for obtaining simultaneous measurements of all three velocity components. A focus of his effort was to minimize errors due to velocity gradients across the sensor array. A physical realization of Vukoslavcevic's XP (and XL) probe configuration was designed and fabricated. New fabrication techniques were implemented to minimize flow blockage and ensure uniform prong taper. In-situ pitch and yaw calibrations of the sensor are realized using a compact articulating jet that employs a novel flow-speed controller as the angle of the jet is varied. We present measurements derived from three facilities: the UNH 8m boundary layer wind tunnel, the University of Melbourne High Reynolds Number Boundary Layer Wind Tunnel (HRNBLWT), and the UNH Flow Physics Facility (FPF). The performance of the XL and XP probe configurations are assessed over a range of Reynolds numbers, as is the effect of pitching the probe at a fixed angle during calibration.

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