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Instantaneous Temperature Measurements using Constant-Voltage Anemometry GENEVIEVE COMTE-BELLOT, Ecole Centrale Lyon, ARGANTHAEL BERSON, Durham University, PHILIPPE BLANC-BENON, EMMANUEL JONDEAU, LMFA, UMR CNRS 5509, Ecole Centrale Lyon — Up to now, cold wires have been operated by constant-current anemometers, with a classic thermal inertia correction based on the mean value of the cold wire time constant [Lemay, Benaïssa & Antonia, Exp. Thermal & Fluid Sci, 2003, 27,133-143] or with a new correction method making use of the instantaneous value of the cold wire thermal lag [Berson, Poignand, Blanc-Benon & Comte-Bellot, Rev. Sci. Instrum. 2010, 81, 015102]. The latter correction method is applied to the constant-voltage anemometer and temperature measurements are presented for the first time with such a device. Two constant-voltage anemometers are used for the instantaneous measurement of temperature fluctuations in unsteady flows. The first one is a new prototype elaborated by Tao Systems Inc. and adapted to fine wires with a resistance between 30 and 100 ohms. It operates a cold wire whose resistance varies with the temperature of the surrounding fluid. The second anemometer is a commercial system by the same company. It operates a hot wire, from which the instantaneous effect of the thermal inertia of the cold wire is determined. Results are presented for two flows: (i) a heated turbulent jet and (ii) an acoustic standing wave inside a resonator where flow reversal occurs.

Genevieve Comte-Bellot
Ecole Centrale Lyon

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