

Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

An in-situ calibration technique for four-wire hot-wire probe in conjunction for atmospheric studies REZA SADR, Assistant Professor, ARINDAM SINGHA, Postdoctoral Research Associate — There is an increasing need to resolve the small-scales of atmospheric turbulence in order to estimate the higher order statistics of the turbulent flow. Sonic anemometers are commonly used in atmospheric research; however their application can only provide data with low spatial and temporal resolution. Hot-wire (HW) probes are still the best tool to obtain turbulent statistics with high temporal and spatial resolution. But HW probes are rarely used for atmospheric measurement due to the intricacy and logistical difficulties associated with the calibration and applications of the required probes for this flow field. In the present study, an in-situ method of calibration of a four-wire hot-wire anemometer is proposed, which bypasses the need for prior calibration. A proper data reduction algorithm has been developed to be used in conjunction with the four-wire probe. The proposed methodology enables one to use the hot-wire anemometer for atmospheric measurement to obtain three dimensional velocity information, at high spatial and temporal resolution, without the necessity of going through extensive calibration procedure. The feasibility of this method has been tested in laboratory and Monte Carlo simulation has been used to establish the stability and sensitivity of the data reduction algorithm.

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Date submitted: 04 Aug 2011

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