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Spectral Measurements from the Optical Emission of the A.C. Plasma Anemometer ERIC MATLIS, CURTIS MARSHALL, THOMAS CORKE, University of Notre Dame, SIVARAM GOGINENI, Spectral Energies, LLC — The optical emission properties of a new class of AC-driven flow sensors based on a glow discharge (plasma) is presented. These results extend the utility of the plasma sensor that has recently been developed for measurements in high-enthalpy flows. The plasma sensor utilizes a high frequency (1MHz) AC discharge between two electrodes as the main sensing element. The voltage drop across the discharge correlates to changes in the external flow which can be calibrated for mass-flux (ρU) or pressure depending on the design of the electrodes and orientation relative to the free-stream flow direction. Recent experiments examine the potential for spectral analysis of the optical emission of the discharge to provide additional insight to the flow field. These experiments compare the optical emission of the plasma to emission from breakdown due to an ND:YAG laser. The oxygen 777.3 nm band in particular is a focus of interest as a marker for the determination of gas density.

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