Electron Density Measurements in a Supersonic Flowing Ar/H₂/Air Discharge

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We performed detailed measurements of the population densities of the N₂ C⁶Π_u - B³Π_g system and the hydrogen Balmer lines in a supersonic flow of weakly ionized Ar/H₂/Air. Gases were premixed in the stagnation chamber at room temperature by adding up to 10% hydrogen and up to 45% air to pure argon. A cylindrical cavity was used to sustain a discharge in the pressure range of 100-700 Pa. Absolute emission spectroscopy was used to determine the gas temperature in the flow from the N₂ system. Comparison was made between the results obtained from the N₂ band intensity technique and Stark broadening of the hydrogen Balmer lines.

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