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Dispersion of a Stationary Acoustic Shock in a Supersonic Flowing Afterglow DERETH JANETTE DRAKE, REZA BIAZARAN, SVETOZAR POPOVIC, LEPOSAVA VUSKOVIC, Old Dominion University — Experimental studies of shock wave dispersion in weakly ionized gas have been mostly performed on traveling shock waves [1,2]. Inability to fully characterize transient phenomena in the shock layer interacting with electric discharge has produced some ambiguity in the interpretation of the phenomenon of dispersion. In the attempt to elucidate the role of excited states in the dispersion, we employed a supersonic microwave flowing afterglow apparatus with a blant solid body suppressing the flow to generate a stationary shock. Commercial microwave generator, operating in S-band, was used to sustain a cylindrical cavity discharge in argon and nitrogen at power density between 3.5 and 7 W/cm^3. The discharge was sustained downstream of the cavity by the traveling microwave field using the quartz tube as the wave guide. Therefore, this plasma generator differs from conventional d.c. flowing afterglow in the ability to sustain ionized gas over a longer distance. As a consequence, electron density was higher, in the range of (1-3)$\times10^{13}$cm^{-3}, which was determined by the Stark broadening technique. Gas temperature was constantly below 800 K that was determined by thermocouple measurements, Doppler component of the observed line profiles, and rotational spectra of nitrogen molecules. Excited state population in argon was measured with combined emission and absorption spectroscopy using the absolute intensities of (4p- 4s) spectral lines. Dispersion effect was observed in the form of a double- peaked distribution of intensities in front of the model. Interpretation of the results will be presented at the conference. [1] P. Bletzinger, B. N. Ganguly, Phys. Lett. A **258** (1999) 342. [2] S. Popovi and L. Vuškovi, Physics of Plasmas **7** (1999) 1448.

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