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Double Electric Layer in Stationary Shock Structures of a Supersonic Flowing Afterglow D.J. DRAKE, J. UPADYAY, S. POPOVIC, L. VUSKOVIC, Old Dominion University, Norfolk, VA 23529 — Mutual interaction between an acoustic shock wave and weakly ionized gas produces many effects that have been studied in recent years [1]. This interaction is manifested as plasma-induced shock dispersion and acceleration, shock wave induced double electric layer, localized increase of electron temperature and density, or enhancement of optical emission. A comprehensive review of this research and its significance for high-speed aerodynamics is given in Ref. [2]. We have performed experiments in a microwave flowing afterglow system and observed the enhancement of optical radiation in the interaction of a stationary shock wave with weakly ionized argon at 100-600 Pa. The enhancement of optical radiation coincided with the calculated standoff distance of the detached shockwave. We studied the stationary shock structures, mainly using the 4p excited state populations of argon, which were measured using absolute emission spectroscopy. Oblique shock parameters were evaluated exactly for the given model geometry, which were usually spherical. We will present results at the conference.
[1] S. Popovic, L. Vuškovic, Phys. Plasmas **6** (1999) 1448.
[2] P. Bletzinger, B. N. Ganguly, D. Van Wie, A. Garscadden, J. Phys. D: App. Phys. **38** (2005) R33.

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