

Abstract Submitted
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Shock Wave Propagation Measurements in Glow Discharge Plasmas¹ NIRMOL K. PODDER, ANASTASIA V. TARASOVA, RALPH B. WILSON IV, Troy University, Troy, AL 36082 — Mach 1.5–2.2 shock waves are produced in argon over a range of pressures 3–15 Torr by a fast capacitor discharge (quarter period $\tau_{1/4} = 1.4 \mu s$). The shock waves are allowed to traverse through a glow discharge plasma inside the shock tube, where the deflections of the laser beams, caused by the density jump at the shock front, are recorded on a fast oscilloscope. An average shock wave velocity in plasma is determined from the time history of the laser deflection signals. Shock wave speeds in plasma are found to be dependent on the plasma discharge current. Shock wave speeds increase by 18% for the plasma at 3.6 Torr over a range of plasma discharge current $I = 0$ –150 mA and by 46% for the plasma at 15 Torr over $I = 7$ –150 mA. In addition, shock wave amplitudes are attenuated in plasma and show linear dependence on the shock wave speed or Mach number.

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