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Charged particle flows in an explosively generated non-ideal plasma C.J. BOSWELL, J.R. CARNEY, J. WILKINSON, G.I. PANGILINAN, Indian Head Division, NSWC, V.H. WHITLEY, LANL — Non-ideal plasmas occur as a result of the stimulation of matter by strong shocks, detonation waves, or concentrated laser irradiation. Since all of these methods of generating non-ideal plasmas are already in use to address other problems, we focus on a detailed understanding of this plasma. In particular, we study the flow of charged particles in a non-ideal plasma generated using an explosive to compress the gas into the non-ideal plasma state. The shock wave in the gas is generated by an explosive located at one end of a guide tube filled with the gas. The detonation produces a shock wave strong enough to ionize the gas. Spectral line emission profiles, recorded with a streak emission spectroscopy system, are used to ascertain neutral and ionized gas properties. The electric and magnetic fields are measured by electrostatic probes and magnetic induction coils which permit the measurement of the temperature, density, and electric potential of the non-ideal plasma; as well as the flow of net electric charges respectively. The results demonstrate that a separation of the positive and negative charges occurs in the vicinity of the shock wave.

Prefer Oral Session
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