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Explosively Generated Plasmas in Noble Gases C.J. BOSWELL, J.R. CARNEY, J.M. LIGHTSTONE, J. WILKINSON, G. PANGILINAN, Indian Head Division - NSWC — 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 generation of this plasma by strong, ionizing guided shock waves. The shock wave in the gas is generated by an explosive located at one end of a guide tube filled with a noble 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 there is a mixing of the detonation products and the noble gas and that there is a pulse of electrons that travel ahead of the shock wave as it travels down the guide tube.

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