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Structure of an Ionizing Shock Wave in a Guide Tube CHRISTOPHER BOSWELL, Naval Surface Warfare Center Indian Head Div — This contribution describes new measurements of an ionizing shock wave, having a shock velocity of $\sim$ 6 km/s, routinely produced in a guide tube filled with gas at atmospheric pressure. Shock waves of this velocity generate temperatures and pressures that are high enough to ionize the gas in which the shock wave is traveling. The plasma generated by this ionizing shock wave is characterized using Rogowski coils, Langmuir probes and visible spectroscopy. Charge separation, or the difference in the electron and ion densities is measured by Rogowski coils. Electron temperatures and densities are measured using Langmuir probes at the edge of the guide tube. Ions are identified by using fiber coupled spectrometers and streak cameras that view the shock wave along the guide tube and radially across it. The measurements show charge separation, an electron temperature of 2 eV and an electron density of 10^{24} m^{-3}. These measurements are the first to show an axial charge separation as well as to characterize the ionizing shock wave on such a fast time scale, ($< 1\mu$s).

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