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**Voitenko experiments with novel diagnostics detect velocities of 89 km/s.** DOUGLAS TASKER, Los Alamos National Laboratory, YOUNG BAE, Y.K. Bae Corp, CARL JOHNSON, KEVIN RAINEY, Los Alamos National Laboratory — Using a Voitenko accelerator, a short series of experiments were performed with the goal of attaining shock velocities in gases approaching 90 km/s. The basic apparatus comprised a hemispherical bowl filled with a gas at atmospheric pressure; a metal piston across its diameter; and a small bore evacuated shock tube at its apex. The evacuated shock tube was separated from the gas bowl by a thin diaphragm. A combination of a plane wave explosive lens and a high explosive pad accelerated the piston to a velocity of the order of 4 km/s and subsequently compressed the gas in the bowl. The thin diaphragm at the other end of the bowl then ruptured and the high pressure (shock compressed) gas escaped into the shock tube. A high speed digital framing camera recorded the light emission from the shock front, photon Doppler velocimetry monitored the piston, and for the first time, a 94-GHz microwave interferometer was used to monitor the position of the front. These diagnostics showed that the shock velocity in helium was 89 km/s in helium and there were interesting features, previously unreported, in the shock propagation detected by the microwave interferometer..

Douglas Tasker  
Los Alamos National Laboratory

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