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Development of a Single Stage Implosion-Driven Hypervelocity Launcher DANIEL SZIRTI, JASON LOISEAU, PATRICK BATCHELOR, ANDREW HIGGINS, VINCENT TANGUAY, FAN ZHANG, McGill University — Work carried out on the development of a single stage implosion-driven hypervelocity launcher is presented. Explosives surrounding a thin-walled tube filled with helium works similar to the pump tube of a conventional light gas gun. Implosion of the tube drives a strong shock that reflects back and forth between the projectile and the implosion pinch, generating very high temperatures and pressures. Experiments to evaluate the implosion dynamics and performance of the pump tube were carried out, with attention given to the helium fill pressure, diameter of the pump tube, thickness of the explosive layer, and the presence of a tamper. Simple analytic models were used to approximate the performance of the launcher; their advantages and limitations are discussed. Experiments with an implosion-driven launcher demonstrated muzzle velocities of 4 km/s with 4-mm-diameter aluminum projectiles, giving good agreement with the analytical models of performance. Projectile integrity was verified by high-speed photography and other diagnostics.

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