

Abstract Submitted
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Comparison of Theory and Measurements of a Two-Stage Light-Gas Gun¹ SCOTT LEVINSON, DON BERRY, BRAD PEDERSEN, STEPHAN BLESS, The University of Texas at Austin, Institute for Advanced Technology — We present a comparison of techniques for obtaining projectile velocity history on a two-stage launcher and discuss gun code accuracy vis-à-vis pressure gauges and the new photonic Doppler velocimetry (PDV) technique. The PDV technique itself is described in a companion paper. The PDV records were differentiated to compute acceleration and, hence, base pressure. Two acceleration episodes are revealed in the data. Base pressure values were compared with measurements from stationary pressure gauges and with predictions of a standard two-stage gun code. The agreement with the pressure gages was satisfactory. Code predictions did not account for the two acceleration stages. However, for the main acceleration episode, the predicted base pressure is in good agreement with the smoothed pressure computed from the PDV record. Both the gauge records and PDV contain short-time pressure spikes which are apparently real. Therefore, use of computed base pressure for projectile design may lead to failures if the projectile is vulnerable to pressure spikes.

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