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Dynamics of shocks in laser-launched flyer plates probed by photon Doppler velocimetry ALEXANDER CURTIS, DANA DLOTT, UIUC — We have developed a laser-launched flyer plate system that lets us launch Al flyers of varying thicknesses at velocities up to 4 km/s using different duration laser pulses. We probe the launch and impact with a target using an 8 GHz PDV system. These 25-100 micron thick flyers produce shocks lasting a few nanoseconds. The launch process involves generating a shock in the Al foil that rings and damps out. When the flyer impacts a target, a complicated shock waveform is generated including a steady shock and a release wave. The duration of the steady shock, usually thought to be about equal to the shock round-trip time in the flyer plate, turns out to be quite different. These phenomena were studied in detail using PDV, and their dynamics depend a great deal on the launch laser pulse duration and the flyer thickness. Of particular interest is how the viscoelastic relaxation of the polymer PMMA depends on shock duration in the short shock regime.

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