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Elastic Wave Amplitude and Attenuation in Shocked Pure AL
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Shock-induced elastic-plastic deformation in pure aluminum was examined at 4 GPa peak stress by measuring wave profiles in thin ($40-180$ μm) samples under plate impact loading. Large elastic wave amplitudes ($\sim$1 GPa) and rapid elastic wave attenuation with propagation distance were observed, indicating a time-dependent elastic-plastic response. These results are in contrast to the $\sim$0.1 GPa elastic wave amplitudes observed in past work (*J. Appl. Phys.* **98**, 033524 (2005)) using thick (>1 mm) samples. The combination of large elastic wave attenuation in thin samples and differences in sample thicknesses between the present and past work suggests a consistent picture of shock wave propagation in pure aluminum: manifestations of time-dependent elastic-plastic response are confined to material very near the impact surface. The present results cannot be fully reconciled with recent shockless compression results (*Phys. Rev. Lett.* **98**, 065701 (2007)). Work supported by DOE.

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