

Title	Acoustic waves undetectable by transient reflectivity measurements
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Abstract	<p>A free-standing GaAs membrane is investigated by pump-probe reflectivity measurements with femtosecond laser pulses of 400-nm wavelength. It is found that the detected wide spectrum of laser-generated coherent strain waves in the membrane does not contain a specific hypersonic frequency. Theoretical analysis reveals that this effect is related to zero sensitivity of the acousto-optic detection at a particular frequency defined by the wavelength of the probe laser pulse on the mechanical free surface of the GaAs membrane. We predict that a similar behavior is expected in Si and Au membranes and films, indicating that the presence of zeros in the spectral transformation function of acousto-optic conversion is a rather general phenomenon in picosecond ultrasonics that has so far been neglected.</p>
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