Abstracts

Acoustic Gas Lenses for Light (Correspondence)

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It has been proposed that sound waves in acoustic waveguides might form lens systems useful for guiding light beams over reasonable distances. The pressure variations of the acoustic waves cause variations in the index of refraction which may have lens-like properties. The analysis of light guiding by a traveling acoustic waveguide mode has been given. Such a wave is an "alternating gradient" focusing system with alternating converging and diverging lenses of approximately equal strength. Such a system has net focusing properties since the average radius in the diverging lenses is less for such a system than in the converging lenses. Acoustic lenses without longitudinal variations have also been utilized for the modulation of lasers, but with solids instead of gases. Although liquids have a higher density of scattering particles than gases, the higher compressibility of gases make the net effect in the latter comparable to that in liquids for at least some applications. It is thus desirable to demonstrate some of the experimental effects in acoustic gas lenses for several acoustic modes.

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