

Abstract Submitted
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Mirage Effect From Thermally-Modulated Transparent Carbon Nanotube Sheet ALI ALIEV, RAY BAUGHMAN — The single beam mirage effect, also known as photothermal deflection, is studied using a free-standing, highly-aligned carbon nanotube sheet as a heat source whose temperature can be modulated over a wide frequency range. The extremely low thermal capacitance and high heat transfer ability of these transparent forest-drawn carbon nanotube sheets enables high frequency modulation of sheet temperature over an enormous temperature range, thereby providing a sharp, rapidly changing gradient of refractive index in surrounding liquid or gas. The advantages of temperature modulation using carbon nanotube sheets are multiple: in inert gases the temperature can reach >2500 K; the obtained frequency range for photothermal modulation is ~ 100 kHz in gases and over 100 Hz in high refractive index liquids; and the heat source is transparent for optical and acoustical waves. The remarkable light deflection in gases and liquids suggests possible application of carbon nanotube sheets for large laser projectors and cloaking systems.

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