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Molecular simulation of nematic liquid crystals under acoustic fields ANTHONY P. MALANOSKI, JONATHAN V. SELINGER, Naval Research Laboratory, Washington, DC — The behavior of a nematic liquid crystal under an acoustic field is investigated in a model system. The anisotropic properties of liquid crystals allow them to be aligned by ultrasonic waves, leading to a change in optical transmission known as the acousto-optic effect. This effect is exploited to image the pattern of acoustic intensity reflected off a target. To gain a better understanding of the fundamental basis of the acousto-optic effect, we have carried out molecular dynamics simulations of a model system of rigid molecules under an acoustic wave. These simulations show that the molecules align with the major axis perpendicular to the direction of propagation of the acoustic wave. The acoustic response increases with increasing molecular chain length. The dependence of the acoustic response on variations in the density and the molecular rigidity has also been studied.

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