Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Dynamics of the acousto-optic effect in a nematic liquid crystal JONATHAN V. SELINGER, VIKTORIA A. GREANYA, ANTHONY P. MALANOSKI, BRIAN T. WESLOWSKI, MARK S. SPECTOR, Naval Research Laboratory, Washington, DC — In a nematic liquid-crystal cell, the application of an ultrasonic wave induces a rotation of the director, leading to a change in the optical transmission through the cell. In earlier work, we have experimentally investigated the key physical parameters that control the steady-state acousto-optic effect, and we have developed a theoretical model for this effect. In this study, we investigate the dynamic response of the optical intensity after the ultrasonic wave is switched on or off. Our experiments show that the optical intensity follows a double-exponential function of time, indicating that the system has two relaxation modes with widely different time scales. The fast mode has an amplitude and time scale consistent with the dynamics of the Freedericksz transition, but the slow mode shows novel behavior associated with the acousto-optic effect.

Jonathan V. Selinger
Naval Research Laboratory, Washington, DC

Date submitted: 29 Nov 2004 Electronic form version 1.4