FERROELECTRIC LIQUID CRYSTAL MATERIALS RESEARCH CENTER

SPECIAL SEMINAR SERIES

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Photonic Crystals and Liquid Crystals

Abstract Photonic crystals having a three-dimensional ordered structure with a periodicity of optical wavelength have attracted considerable attention from both fundamental and practical points of view, because in such materials novel physical concepts such as photonic band gap have been theoretically predicted and various applications of photonic crystals have been proposed. Especially, the study of stimulated emission in photonic band gap is one of the most attractive subjects, since, in the band gap, a spontaneous emission is inhibited and low-threshold lasers based on photonic crystals are expected. In a one-dimensional periodic structure, the laser action has been expected at the photonic band edge where the photon group velocity approaches zero. So far intensive studies on one- and two- dimensional band gap materials have been performed. We have investigated photonic band characteristics of self-organized systems such as opal and chiral liquid crystal, and have proposed a tunable photonic crystal based on nano-structured liquid crystal in which, for instance, the stop band position or lasing wavelength can be tuned by an external stress. I present photonic effects such as electrically tuned stop band shift in an opal and polymer inverse opal infiltrated with liquid crystals and tunable laser actions in the dye-doped chiral liquid crystal having a nano-scale helicoidal structure.

Wednesday, August 4, 2004 at 4:00 p.m.
Duane Physics, 11th Floor Commons Room

Sponsored by the Ferroelectric Liquid Crystal Materials Research Center,
Department of Physics, University of Colorado.

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