

Public Lecture: 9:00 - 10:00 p.m.

Liquid Crystals and Rubbers: Combining Scientific Fields for New Technologies

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In recent years, scientists and engineers have developed new materials, called "liquid crystal elastomers," which combine the features of liquid crystals with those of rubbers. Like conventional rubbers, liquid crystal elastomers are crosslinked polymer networks that can be highly extended. Like liquid crystals, these materials have orientational order, with molecules that spontaneously align in some direction. The combination of these properties leads to surprising new types of behavior, including:

- Coupling between temperature and sample shape, so that a temperature change can induce an extension of 400%.
- Coupling between mechanical stress and the orientation of the molecules.
- Coupling between mechanical stress and the helical pitch of twisted elastomers, and hence the color of the resulting laser light
- Coupling between optical illumination and sample shape in elastomers that are doped with dye.

This lecture will provide a general survey of the science of liquid crystal elastomers, as well as technological applications of these materials. The lecture will be given on the level of college freshmen. Kent State undergraduates and other members of the community are warmly invited to attend.