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LIQUID CRYSTAL ELASTOMERS
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ABSTRACT

Liquid crystal elastomers (LCEs) represent a modestly recent material, first theorized in the 1970s and only first manufactured in the 1980s. LCEs were initially difficult to procure but new synthesis methods have been developed and access to them is increasing. Much of their uniqueness arises from physical phenomena that are amenable to description via director theories and tensorial order parameter techniques. This situation gives rise to anomalous ultra-low softness, coupling effects to electromagnetic fields, as well as thermal and magnetic coupling phenomena. This leads to interesting material design and application possibilities that do not exist with conventional materials. LCEs originate from liquid crystal (fluids) but present very unique modeling and computational problems due to their long-chain cross-linked internal structure. In recent years there has been a steadily increasing interest in these fascinating materials due to both their unusual properties but also due to the promise they hold for the creation of novel multifunctional materials. These sessions aim to bring together experts in modeling, computation, experimentation, physical synthesis, and applications in order to advance the field.

Particular areas of interest in LCE research include but are not limited to:

- Quasi-static and dynamic property characterization of LCEs;
- Continuum and molecular modeling, statistical mechanical as well as phenomenological approaches to LCEs;
- Studies on convexities of free-energies and relaxation methods for LCEs;
- Computational methods for LCE with a special interest in methodologies for coupled phenomena;
- Studies on the synthesis of LCEs and their measured properties;
- Applications of LCEs in engineering practice.