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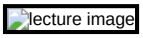

Special Guest Lectures

Modeling and Simulation of Liquid Crystal Elastomers

Wei Zhu, Courant Institute of Mathematical Sciences, New York University

Johnston Hall 338
January 29, 2008 - 03:40 pm

Abstract:
Liquid crystal elastomers (LCEs) are solid rubbers, consisting of weakly cross-linked liquid crystal polymers with orientationally ordered side-chain/main-chain mesogenic rods. The remarkable property of LCEs is the coupling between mechnical deformation and orientational order, which makes these rubbers very sensitive to external stimuli, such as illumination or other applied fields, and thus lead to huge deformations. Many experimental or theoretical results on the equilibrium properties have been obtained. However, the dynamics of how liquid crystal elastomers evolve subject to external stimuli is not fully understood. In this talk, I will first discuss how a continuum model was developed to characterize the dynamics of LCEs. Secondly, I will detail the numerical implementations by applying the Chebyshev polynomial scheme for the induced evolution equations. I will then present some numerical results, which demonstrate that our proposed model can successfully capture many phenomena observed in real experiments, such as LCE sample buckling, twisting.

Speaker's Bio:
Wei Zhu is currently a postdoctoral researcher at the Courant Institute of Mathematical Sciences at NYU. He received his Ph.D. from UCLA, 2004. Zhu's research interests include: numerical analysis and scientific computing; mathematical modeling and simulation on active materials; image processing; visual neuroscience, computational biology; and partial differential equations and variational methods.

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