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Tension and Rupture Dynamics of Freely-Suspended Bent-Core Liquid Crystalline Fibers OLIVER KRESS, SEYYED MUHAMMAD SALILI, Chemical Physics Interdisciplinary Program and Liquid Crystal Institute, Kent State University, Kent, OH 44242 USA, TANYA OSTAPENKO, Institute of Experimental Physics, Otto-von-Guericke-Universität, Universitätsplatz 2 39106 Magdeburg, Germany, CHRISTOPHER BAILEY, Leidos, 3745 Pentagon Blvd., Beavercreek, OH 45431, ALEXEY EREMIN, RALF STANNARIUS[1], Institute of Experimental Physics, Otto-von-Guericke-Universität, Universitätsplatz 2 39106 Magdeburg, Germany, ANTAL JÁKLI[2], Chemical Physics Interdisciplinary Program and Liquid Crystal Institute, Kent State University, Kent, OH 44242 USA, JÁKLI LAB TEAM[3], ABTEILUNG NICHTLINEARE PHÄNOMENE, "DEPARTMENT OF NONLINEAR PHENOMENA", PROF. RALF STANNARIUS TEAM[4] — Euler buckling, a physical mechanism which classically describes deformations in an elastic beam, has been expanded to describe the recoil of viscoelastic liquid crystalline filaments. Rupture of the freely suspended filaments resulted in a buckling instability that propagated through the filament. A characteristic wavelength and a time constant emerge as the filament recoils. Tensions of the suspended filaments were measured by induced mechanical deflection. The analysis of the results reveals a temperature dependent competition between surface and bulk effects that distinguishes these viscoelastic filaments from classical elastic beams.

[1]http://www.uni-magdeburg.de/anp/
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