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Generalized Order Parameters for Systems of Orientationally Ordered Anisometric Particles MICHAEL SHELLEY, Courant Institute of Mathematical Sciences, New York University, NY, USA, SHARON C. GLOTZER, Department of Chemical Engineering, University of Michigan, Ann Arbor, MI, USA, PETER PALFFY-MUHORAY, Liquid Crystal Institute, Kent State University, Kent, OH, USA, COURANT INSTITUTE OF MATHEMATICAL SCIENCES, NEW YORK UNIVERSITY, NY, USA COLLABORATION, DEPARTMENT OF CHEMICAL ENGINEERING, UNIVERSITY OF MICHIGAN, ANN ARBOR, MI, USA COLLABORATION, LIQUID CRYSTAL INSTITUTE, KENT STATE UNIVERSITY, KENT, OH, USA COLLABORATION — A variety of nanoparticle systems, such as semiconductor nanowires, mineral liquid crystals, colloidal clays and ferrofluids can exhibit orientationally ordered phases. These systems are therefore liquid crystals, where the relevant constituents are nanoparticles rather than molecules. We introduce generalized order parameters, based on the symmetry of the constituents, to describe orientational order in such systems. We describe the procedure to identify the relevant order parameters, discuss the connection between these and experimental observables and present the results obtained from simulations. Some mathematical issues related to representations are also addressed.

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