Abstract Submitted
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Formation and Phase Transformations of Helical Structures of Colloidal Spheres[1] MATTHEW LOHR, University of Pennsylvania, AHMED ALSAYED, CNRS-Rhodia-UPenn UMI 3254, BRYAN CHEN, ZEXIN ZHANG, RANDALL KAMIEN, ARJUN YODH, University of Pennsylvania — We experimentally explore the ordering of thermal quasi-one dimensional helical structures of monodisperse spheres. Helical packings of thermoresponsive colloid particles are formed in glass microcapillaries and display evidence of long-range orientational order at high volume fractions. As volume fraction is decreased, these ordered packings transition to structurally disordered states. Orientational order parameters and susceptibilities demonstrate the abrupt nature of this crossover. Coexistence of ordered and disordered states is also exhibited at lower volume fractions, as well as coexistence of ordered domains with different pitch and chirality. Such coexistence lends credence to the notion of discontinuous transitions in these structures. We also present preliminary experimental work on producing and controlling the formation of ordered helical structures of unconfined colloids by tuning both short-range attractive and dipolar interactions between particles.

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