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**Ordered and disordered colloidal particle monolayers at liquid crystal interfaces**[1] WEI-SHAO WEI, MATTHEW LOHR, MOHAMED AMINE GHARBI, University of Pennsylvania, Department of Physics and Astronomy, KATHLEEN STEBE, University of Pennsylvania, Department of Chemical and Biomolecular Engineering, A.G. YODH, University of Pennsylvania, Department of Physics and Astronomy — In this work, we investigate ordered colloidal particle monolayers at the air/liquid-crystal (LC) interface. Specifically, silica microparticles are treated with DMOAP to create homeotropic anchoring of LC mesogens at their surfaces. These particles are then spread on an air-exposed interface of the LC 5CB. Macroscopic ordered patterns of these microparticles form due to long-range interactions between particles that are mediated by elastic deformations of the underlying LC. Different confinement conditions lead to various self-assembled patterns ranging from hexagonal lattices to chain-like dipole formations. Using dark-field video microscopy, we track and analyze the dynamics of the colloidal particles in the hexagonal crystal packing, deriving mean squared displacements, phonon modes and density of states, etc., under several conditions. Further, heating of the nematic LC into its isotropic phase enables us to observe melting dynamics of this unusual quasi-2D crystal. The investigations provide insight into crystalline packings controlled by liquid-crystal mediated colloidal interactions.

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