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**Quantitative study of the colloidal interaction forces and defect line tension in liquid crystals using optical trapping of polymer particles and defects** IVAN SMALYUKH, OLEG LAVRENTOVICH, Chemical Physics Interdisciplinary Program and the Liquid Crystal Institute, Kent State University, Kent, OH 44242, ANDREY KUZMIN, ALEKSANDR KACHYNSKI, PARAS PRASAD, The Institute for Lasers, Photonics, and Biophotonics, University at Buffalo, The State University of New York, Buffalo, NY 14260-3000 — We demonstrate optical trapping and manipulation of defects and transparent microparticles in a thermotropic nematic liquid crystal with low birefringence. The three-dimensional director fields and positions of the particles manipulated by laser tweezers are visualized using the Fluorescence Confocal Polarizing Microscopy. The disclination lines are manipulated using tightly-focused linearly-polarized laser beams and optically trapped colloidal particles. We employ the particle manipulation to measure line tension of a topologically stable disclination line and to determine colloidal interaction of particles with perpendicular surface anchoring of the director at their surfaces. We show that the laser trapping of particles and defects in liquid crystals opens new possibilities for their fundamental studies as well as for new applications, such as assembling of colloidal structures and photonic crystals in the liquid crystal medium.

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