UDC 544.252.22

LIGHT-INDUCED GENERATION OF DYNAMIC SUPRAMOLECULAR PATTERNS IN PHOTO-RESPONSIVE CHIRAL NEMATICS

Darmoroz D.D. (ITMO University), **Piven A.O. (**ITMO University)
Scientific supervisor - candidate of Physical and Mathematical sciences Orlova T.
(ITMO University)

It was considered that if the concentration of interconverting molecular motors or switches reaches a photo-stationary state, then any supramolecular motion ceases irreversibly. To get around this limitation and demonstrate molecular machine-oriented motion amplified to the supramolecular scale, researchers have typically relied on creating varying lighting conditions.
However, an opto-molecular approach based on the reaction-diffusion process of photo-responsive molecular motors in a nematic host has been proposed for the creation of dynamic localized structures in frustrated chiral nematics under continuous light illumination.
A unique revolving pattern was created using an ultraviolet Gaussian beam with a beam power of only 10-100 nW as well as several static localized structures. The interaction between the twisting of the supramolecular structure and the diffusion of chiral molecular motors results in a continuous, regular and unidirectional rotation of the liquid crystal structure under non-equilibrium conditions.
We aim to discover new photoactive rotating localized structures, demonstrate controllable reconfigurations of these structures and tunable behavior control.
The high relevance of our research is due to intensive scientific and technical development in the fields of adaptive and reconfigurable soft materials for transport applications, delivery systems and soft robotics.

Darmoroz D.D. (author) Signature

Orlova T. (supervisor) Signature