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Controlling topological defects in Living Liquid Crystals NURIS FIGUEROA-MORALES, The Pennsylvania State University, ANDREY SOKOLOV, Argonne National Laboratory, MIKHAIL M. GENKIN, Cold Spring Harbor Laboratory, IGOR S. ARANSON, The Phennsylvania State University — A realization of active nematics has been conceived by combining swimming bacteria and a lyotropic liquid crystal. The complex dynamics of such active material arises from the non-trivial interplay between hydrodynamic flows and elastic forces: while bacteria are guided by the local director field, the local alignment of the liquid crystal is disturbed by the swimming bacteria. At high bacterial concentration, the domination of bacterial activity leads to creation of motile topological defects, which alter bacterial distribution. Here, we experimentally explore the possibility of controlling and pinning of emerged topological defects by artificially created microstructures. The microstructures were printed using a state-of-art multiphoton 3D lithography system and mimicked the shape of defects cores. While -1/2 defects may be easily pinned to the created pattern, +1/2 defects remain motile. Due to an attraction between opposite defects, positive defects remain in the vicinity of pined negative defects, significantly diminishing their diffusivity.

Nuris Figueroa Morales
The Pennsylvania State University

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