Spatiotemporal control of active materials

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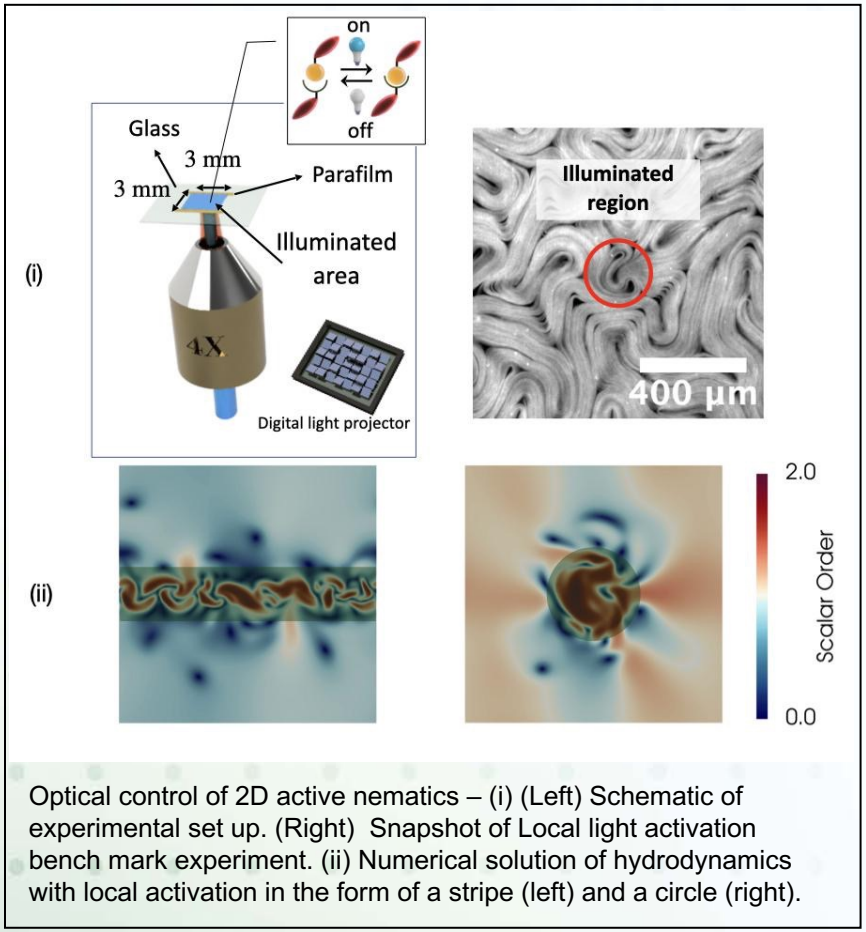
Biological cells control spatial and temporal generation of active stresses to achieve diverse sought-after functionalities ranging from motility to cell division. Motivated by these observations, IRG2's goals are to control of spatiotemporal patterns of active stresses and to endow soft materials with lifelike functionalities. Achieving these goals requires development of new elements of active stress that are under external control as well as developing theoretical models that can predict how these stresses are controlled in space and time to generate targeted dynamics.



Optical control of 2D active nematics – (i) (Left) Schematic of experimental set up. (Right) Snapshot of Local light activation bench mark experiment. (ii) Numerical solution of hydrodynamics with local activation in the form of a stripe (left) and a circle (right).