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Active nematics on the surface of a torus[1] PERRY ELLIS, YA-WEN CHANG, ALBERTO FERNANDEZ-NIEVES, Georgia Institute of Technology — Nematic materials on the surface of a sphere must have a net topological charge of $s = +2$. In equilibrium nematics experiments have shown that this net topological charge can be realized with four $s = +1/2$ defects, which also corresponds to the theoretically expected ground state configuration. Surprisingly, even though active nematics are continuously driven out of equilibrium by the internal energy of the nematogens, when confined to the surface of a sphere these materials can also realize this net topological charge with four $s = +1/2$ defects. In contrast to the spherical confinement case, the situation for toroidal confinement has not been experimentally explored despite the existence of theory and simulation work examining the structure of ordered materials on the surface of a torus. Here, we experimentally realize an extensile active nematic confined to a toroidal surface and explore how the interplay between topology, activity, and nematic elasticity affect the structure and dynamics of the material.

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