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Dynamics of Colloids in Nematic Liquid Crystals[1]

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Dynamics of small particles in fluids have fascinated scientist for centuries. Phenomena such as Brownian motion, sedimentation, and electrophoresis continue to inspire cutting-edge research and innovation. The fluid in which the particles move is typically isotropic, such as water or a polymer solution. Recently, our group started to explore what would happen if particles are placed in an anisotropic fluid: a liquid crystal. The study reveals that the liquid crystal changes dramatically the dynamic behavior, leading to levitation of the particles, their anomalous Brownian motion and new mechanisms of eletrokinetics. The new phenomena are rooted in anisotropy of the liquid crystal properties, such as surface tension and elasticity, different electric conductivity in the directions parallel and perpendicular to the average molecular orientation.

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