Bacterial Dynamics in Curved Spaces

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The interplay between complex environments and active matter suggests a possibility to control and engineer active matter by carefully designing the confinement structures. It is now well established that confinement may influence transport, rheology, pressure, spatial distribution and collective motion of active matter. Curved confining walls, which are ubiquitous in biological systems, show their own, specific rich and intriguing effects on active matter. Here, using a double emulsion system, where the inner and outer droplet sizes can be independently controlled, we experimentally investigate the influence of curved confinement on an active bath of *Escherichia coli* bacteria. In particular, we analyze the fluctuations of the inner droplet using the framework of a stochastic "active noise" model, and show that the strength of active noise is not an intrinsic property of an active bath, but depends on the confinement curvature. Our results pose new challenge to active matter theory and suggest new methods to control active matter.