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Mechanical pressure of bacterial suspensions[1] XIAOLEI MA, SHUO GUO, ZHENGYANG LIU, SEUNGHWAN SHIN, University of Minnesota, XINLIANG XU, Beijing Computational Science Research Center, XIANG CHENG, University of Minnesota — Mechanical pressure exerted by swimming microswimmers show unique properties different from its counterpart in thermal equilibrium systems. Although the mechanical pressure plays a central role in various theories of active fluids, systematic experimental study of the pressure is still few and far between. Here, we investigate the mechanical pressure of suspensions of Escherichia coli (*E. coli*) in quasi-two-dimensional systems of different boundaries. For fixed boundaries, the pressure shows a non-trivial dependence on the geometry of the boundaries, suggesting the non-thermodynamic nature of the mechanical pressure. We further explore the interaction between *E. coli* and freely-moving semi-flexible walls composed of DNA-linked colloidal chains. The chains show enhanced diffusion in bacterial bath, where the diffusivity decreases with the increase of chain length. We construct a simple model based on the hydrodynamic alignment of *E. coli* with the walls, which quantitatively explain experimental findings. Our results shed light on the complex interplays between hydrodynamic interactions, boundary geometries, and mechanical pressures of active bacterial suspensions.

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