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Swimming bacteria at complex interfaces DIEGO LOPEZ[1], ERIC LAUGA[2], Dept. Mechanical and Aerospace Engineering, University of California San Diego, USA — Swimming microorganisms such as bacteria often move in confined geometries. Such confinement can be caused by the presence of solid boundaries, free surfaces, or liquid interfaces. It is well established that confinement affects significantly locomotion, generating additional forces and torques on the bacteria. In the presence of a solid boundary (imposing a no-slip condition), microorganisms using helical propulsion undergo circular motion (clockwise in the case of E. coli). Conversely, close to a free (no-shear) surface the circular motion is reversed. However, realistic interfaces are complex, and experimental results do not always agree with theoretical predictions. In this work, we show, using analytical modeling, how different complex interfaces affect a nearby bacterium and modify its swimming kinematics.

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