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**Helical swimming in confined geometries** KENNETH S. BREUER, BIN LIU, THOMAS R. POWERS, Brown University — We discuss how bacterial swimming is affected by spatial confinement at the micron scale, as in a porous medium. We model a bacterial swimmer in a porous medium by a rotating rigid helix in a cylindrical cavity with smooth walls. A novel boundary element method is introduced to make full use of the helical symmetry. This method allows us to investigate situations of tight confinement in which the helix comes very close to the walls. We show that the confinement enhances the swimming efficiency, especially when the circumference of the tube matches the contour length of one helical pitch. To our surprise, at fixed power consumption, a highly-coiled swimmer swims faster in a narrower confinement, while a more open coil swims faster in a cavity with a wider opening.

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