If possible, please put this talk after the experimental one.

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Numerical study of the motion of a flagellated swimmer inside a tube in the Stokes regime JI ZHANG, YUSHENG JIAO, XINLIANG XU, YANG DING, Beijing Computational Science Research Center — Confined environments are common to micro-swimmers such bacteria and previous studies have shown that confinements such as a wall can influenced the trajectory of the micro-swimmers. Here we study whether some micro-swimmers can achieve a higher speed and energetic efficiency within a long tube comparing to the free-space case using a numerical model. The swimmer consists of an elliptical head and two helical flagella. To solve the governing Stokes equations inside an infinite tube, we combine the method of fundamental solution (MSF) and the method of Stokeslet. The geometry parameters, including shape and size of head and flagella, and relative spatial position of these components, are varied. Our results show that the geometry of the swimmer and the tube can greatly affect the speed of the micro-swimmer. For certain geometric parameters of the micro-swimmer, a greater confinement leads to a higher speed, which is consistent with the results from our robotic experiments.

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