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Magnetic Control of Rigid Achiral Microswimmers U CHEANG, Drexel University, FARSHAD MESHKATI, HENRY FU, University of Nevada, MINJUN KIM, Drexel University — We report control of rigid achiral microswimmers in low Reynolds number environments. A rotating magnetic field was used to actuate the microswimmers wirelessly by rotating the microswimmers, which produces propulsion. Previous magnetically actuated microswimmers in bulk fluids have been designed with either flexibility or chiral geometry; we show that simpler geometries with neither flexibility nor chirality can produce propulsion. The microswimmer consists of three magnetic beads conjugated using avidin-biotin linkages into an arc formation. We designed a magnetic field generator consisting of electromagnetic coils arranged in an approximate Helmholtz configuration. A high-speed camera provided realtime imaging of the microswimmers' motion in a PDMS chamber. The rigidity of the microswimmer was characterized by tracking the position of the individual beads and calculating their relative distances. As a function of field strength and rotation frequency, we observed changes in the rotational axis of the microswimmers and the corresponding effects on their velocities. The achiral microswimmers exhibited active propulsion and were controllable in both speed and direction, which demonstrates the possibility for future biomedical applications such as drug delivery.

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