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How synthetic microswimmers move, turn, flip, and spread
DAISUKE TAKAGI, ADAM BRAUNSCHWEIG, JUN ZHANG, MICHAEL SHELLEY, New York University — We study the dynamics of bimetallic rods that are propelled catalytically in a fluid of chemical fuel. Our experiments reveal that self-propelled rods near a surface undergo systematic turns, spontaneous flips, and dispersion at a rate that saturates with increasing speed. These phenomena can be explained quantitatively by our mathematical model only by incorporating a slight curvature in the rods. The model shows how minor variations in particle shape lead to major changes in trajectory patterns and diffusivity, and offers insight into dispersion of both synthetic and biological swimmers.

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