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Magnetoelastic Filament Robot Mimics Anguilliform Swimming in Soft Sediments[1] TRINH HUYNH[2], ARSHAD KUDROLLI[3], Clark University
— We study the locomotion of a swimmer with a magnet head and elastic tail in fluid-saturated granular media driven by an oscillating magnetic field. Our studies are motivated by soft robot designs based on biomimetic principles which organisms exploit in response to the surrounding environment and stimuli. The applied oscillating field, magnetic field strength, and filament tail length, along with the sediment volume fraction and depth are control variables, in our study. Exploiting refractive index matching of the grains, we measure the shape and speed of the robot over time. We will discuss the nonlinear increase of swimming speed and oscillation amplitude of the tail observed with driving frequency, and a minimal model which captures the overall behavior.

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