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Rolling and spinning swimmers MICHELLE DRISCOLL, MELISSA FERRARI, MENA YOUSSEF, PAUL CHAIKIN, STEFANO SACANNA, New York Univ NYU — We study the dynamics and collective interactions that occur in a system of rotating active matter: an oscillating, externally applied magnetic field is used to drive motion in a system of confined, magnetic colloids. By adjusting the orientation, frequency, and amplitude of the applied field we can drive a wide range of particle motions, from rolling to spinning. These rotations lead to a large variety of collective behaviors, which are driven both by particle-particle magnetic interactions as well as long-range hydrodynamic flows. We observe that the clustering which results from in-plane spinning can be strongly modulated by changing inter-particle magnetic interactions. We explore the strength of this clustering as a function of particle interaction, and can isolate the effect of magnetic and hydrodynamic interactions. We also observe that particle rotation can lead to complex and large-scale flows for both the case of rolling and spinning particles.

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