

Long-range forces between bodies in active matter

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A single non-spherical body placed in an active fluid generates currents. When two or more passive bodies are placed in an active fluid these currents lead to long-range interactions. Using a multipole expansion their leading-order behaviors will be characterized in terms of single-body properties. The interactions are showed to decay as a power law with the distance between the bodies, be anisotropic, and not obey an action-reaction principle. The interactions lead to rich dynamics of the bodies, illustrated by the spontaneous synchronized rotation of pinned non-chiral bodies and the formation of traveling bound pairs. The occurrence of these phenomena depends on tunable properties of the bodies, thus opening new possibilities for self-assembly mediated by active fluids.

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