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Synchronization of flagella

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Motivated by the observed coordination of nearby beating flagella, we use highly controlled simple model experiments with rotating paddles to study how hydrodynamic interactions can lead to phase-locking. The agreement between our numerical models and experimental results confirms that hydrodynamic interactions can lead to synchronization or phase-locking if the system has sufficient flexibility. We also present a simple theory, valid for weakly interacting paddles, for both viscous and viscoelastic fluids.