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Model for hydrodynamic synchronization of beating cilia in a viscoelastic fluid THOMAS POWERS, HENRY FU, Brown University — The synchronization of beating flagella or cilia is important for swimming microorganisms such as Chlamydomonas as well as transport processes such as the clearing of foreign bodies from the airway. Many of these situations involve Newtonian fluids, but some such as the airway involve viscoelastic fluids. A hypothesis currently under intense investigation is that hydrodynamic interactions between nearby beating cilia lead to synchronization. Theoretical studies of simple models consisting of orbiting spheres in Newtonian liquids show that the spheres lock phases when they are subject to suitable normal forces. This talk describes a theoretical study of how synchronization arises in viscoelastic fluids.

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