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Cooperative Motion in Lipid Bilayer Membranes BENEDIKT HARTMANN, FRANCIS STARR, Wesleyan University — Lipid bilayer membranes, like the cell membrane, are complex biological systems. Transport of specific molecules in and out of cells are controlled by these membranes. Therefore, it is vital to understand the detailed dynamics that ultimately control membrane transport. We use molecular dynamics simulations of a coarse-grained and solvent-free lipid model that has been previously shown to spontaneously assemble a bilayer structure. Approaching the crossover to the gel-like state of the bilayer, the lipid dynamics become extremely slow. We analyze the cooperativity of the lipid motion and compare it with the cooperativity that has been well-characterized in liquids nearing a glass transition. Future simulations will examine the generality of this behavior using more realistic models, and comparing with experiments.

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