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Gravity Induced Sedimentation of Giant Lipid Vesicles ANDRES GONZALEZ-MANCERA, IVAN REY SUAREZ, CHAD LEIDY, Universidad de los Andes — The mechanical properties of the lipid bilayer influence the gravity-induced sedimentation of vesicles toward a horizontal surface. In this work, the sedimentation rate and strain of lipid vesicles is studied using computational simulations performed using an algorithm based on the boundary element method. The mechanical behavior of the lipid bilayer is modeled considering two modes of deformation responsible for increases in area strain. The first is the smoothing of suboptical thermal undulations and the second is the direct stretching of the area per lipid molecule. Properties of the lipid bilayer are controlled by adjusting its bending and area compressibility moduli. The electrostatic interaction between the sedimenting vesicle and the glass surface is also considered in order to improve agreement with our experimental measurements. We use the linear Deryaguin approximation, which takes into account ionic screening, to calculate the electrostatic repulsive interaction between the glass surface and the charged vesicle. The algorithm shows good agreement with experimental results for both the sedimentation rate and vesicle deformation at equilibrium.

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