

Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Breathing and tumbling of multicomponent vesicles in a shear flow¹ PRERNA GERA, University of Wisconsin - Madison, DAVID SALAC, University at Buffalo, SAVERIO SPAGNOLIE, University of Wisconsin - Madison — Biological membranes are composed of numerous proteins and molecules which can form domain-like structures, resulting in variable material properties such as bending rigidity and spontaneous curvature of the membrane. In this talk we will focus on a two dimensional multicomponent vesicle in shear flow. Using small amplitude perturbation analysis a reduced order model is developed, revealing tank-treading and tumbling modes, and a new breathing mode which depends on membrane inhomogeneity. The theoretically derived dynamics are compared to the results of full numerical simulations. The utility of this model to predict spatially-varying membrane bending rigidity or spontaneous curvature in the lab setting will also be discussed.

¹P. Gera and S. Spagnolie acknowledge support from the NSF/NIH(DMS/NIGMS 1661900 D. Salac acknowledges support from the NSF(CBET 1253739)

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Date submitted: 10 Aug 2020

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