

Abstract Submitted  
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**Long-wave Dynamics of a Membrane in an Electric Field** YUAN-NAN YOUNG, New Jersey Institute of Technology, SHRAVAN VEERAPANENI, University of Michigan, MICHAEL MIKSI, Northwestern University — We investigate the long-wave non-linear dynamics of an inextensible capacitive elastic membrane under electric fields. The long-wave formulation allows us to analyze the equilibrium membrane profile in a d.c. field. Numerical studies of the governing equation with an integral constraint (for the constant membrane area) elucidate how the membrane bending modulus, electric potential, and frequency of the a.c. electric field gives rise to various membrane dynamics and equilibrium profiles. Pillar formation under the constant area constraint is found as we decrease the membrane bending modulus or increase the electric potential. Increasing the a.c. field frequency stabilizes the membrane profile, and we find the surrounding fluid flow to correlate closely with the local membrane curvature.

Yuan-Nan Young  
New Jersey Institute of Technology

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