Activating membranes ANANYO MAITRA, Indian Insititute of Science, Bangalore 56001, India, PRAGYA SRIVASTAVA, Physics department, Syracuse University, Syracuse, NY-13244, USA, SRIRAM RAMASWAMY, TIFR Centre for Interdisciplinary Sciences, Hyderabad 500075, India, MADAN RAO, Raman Research Institute, C.V. Raman Avenue, Bangalore 560 080, India — We formulate a hydrodynamic theory of a fluid membrane coupled to a bulk medium comprising treadmilling filaments endowed with active stresses and show that active membrane dynamics [Phys. Rev. Lett **84**, 3494 (2000)] and spontaneous shape oscillations emerge from this description. We also consider membrane instabilities and patterns induced by the presence of filaments with polar orientational correlations in the tangent plane of the membrane. The dynamical features we predict should be seen in a variety of cellular contexts involving the dynamics of the membrane-cytoskeleton composite and cytoskeletal extracts coupled to synthetic vesicles.

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