

Abstract Submitted
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Membrane fluctuations driven by actin and myosin: waves and quantized division. NIR GOV, ROIE SHLOMOVITZ, Weizmann Institute of Science — We present a model which couples the membrane with the protrusive forces of actin polymerization and contractile forces of molecular motors, such as myosin. The actin polymerization at the membrane is activated by freely diffusing membrane proteins, that may have a distinct spontaneous curvature. Molecular motors are recruited to the polymerizing actin filaments, from a constant reservoir, and produce a contractile force. All the forces and variables are treated in the linear limit, which allows us to derive analytic solutions. Our results show that for convex membrane proteins the myosin activity gives rise to propagating membrane waves similar to those observed on different cells. For concave membrane proteins the myosin activity gives rise to an unstable contraction, which yields a length-quantization of the mitosis process.

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