

Abstract Submitted
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Membrane-mediated interactions drive the condensation and coalescence of FtsZ rings¹ ROIE SHLOMOVITZ, NIR GOV , Weizmann Institute — The role of the coupling between the shape of membrane-bound filaments, and the membrane, is demonstrated for the dynamics of FtsZ rings on cylindrical membranes. Filaments with an arc-like spontaneous curvature, and a possible added active contractile force, are shown to spontaneously condense into tight rings, associated with a local inwards deformation of the membrane. The long-range membrane-mediated interactions are attractive at short ring-ring separations, inducing the further coarsening dynamics, whereby smaller rings merge to form larger and fewer rings, that deform the membrane more strongly. At the same time, these interactions induce a potential barrier that can suppress further ring coalescence at a separation of about 2π times the cylinder radius. These results of the model are in very good agreement with recent in-vitro experiments on the dynamics of FtsZ filaments in cylindrical liposomes. These results emphasize the important role of long-range membrane-mediated interactions in the organization of cytoskeletal elements at the membrane.

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