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Spontaneous actin dynamics in contractile rings[1] KARSTEN KRUSE, Theoretical Physics, Saarland University, 66123 Saarbruecken, VIKTORIA WOLLRAB[2], RAGHAVAN THIAGARAJAN, Laboratory of Cell Physics, Institut de Science et d'Ingnierie Supramolculaires, 67083 Strasbourg, France, ANNE WALD, Theoretical Physics, Saarland University, 66123 Saarbrucken, DANIEL RIVELINE, Laboratory of Cell Physics, Institut de Science et d'Ingnierie Supramolculaires, 67083 Strasbourg, France — Networks of polymerizing actin filaments are known to be capable to self-organize into a variety of structures. For example, spontaneous actin polymerization waves have been observed in living cells in a number of circumstances, notably, in crawling neutrophils and slime molds. During later stages of cell division, they can also spontaneously form a contractile ring that will eventually cleave the cell into two daughter cells. We present a framework for describing networks of polymerizing actin filaments, where assembly is regulated by various proteins. It can also include the effects of molecular motors. We show that the molecular processes driven by these proteins can generate various structures that have been observed in contractile rings of fission yeast and mammalian cells. We discuss a possible functional role of each of these patterns.

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