

Abstract Submitted
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Non-equilibrium self-assembly of a filament coupled to ATP hydrolysis PADINHATEERI RANJITH, Institut Curie — We study the stochastic dynamics of growth and shrinkage of single actin filaments or microtubules taking into account insertion, removal, and ATP/GTP hydrolysis of subunits. The resulting phase diagram contains three different phases: two phases of unbounded growth : a rapidly growing phase and an intermediate phase, and one bounded growth phase. We analyze all these phases, with an emphasis on the bounded growth phase. We also discuss how hydrolysis affects force-velocity curves. The bounded growth phase shows features of dynamic instability, which we characterize in terms of the time needed for the ATP/GTP cap to disappear as well as the time needed for the filament to reach a length of zero (*i.e.* to collapse) for the first time. We obtain exact expressions for all these quantities, which we test using Monte Carlo simulations.

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