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Similarity of ensembles of trajectories of reversible and irreversible growth processes[1] KATHERINE KLYMKO, UC Berkeley — Models of bacterial growth tend to be 'irreversible', allowing for the number of bacteria in a colony to increase but not to decrease. By contrast, models of molecular self-assembly are usually 'reversible', allowing for addition and removal of particles to a structure. Such processes differ in a fundamental way because only reversible processes possess an equilibrium. Here we show at mean- field level that dynamic trajectories of reversible and irreversible growth processes are similar in that both feel the influence of attractors, at which growth proceeds without limit but the intensive properties of the system are invariant. Attractors of both processes undergo nonequilibrium phase transitions as model parameters are varied, suggesting a unified way of describing reversible and irreversible growth. We also demonstrate an efficient method for sampling the rare events in these growth models.

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