Ordered Self-Similar Patterns in Anisotropic Stochastic Growth

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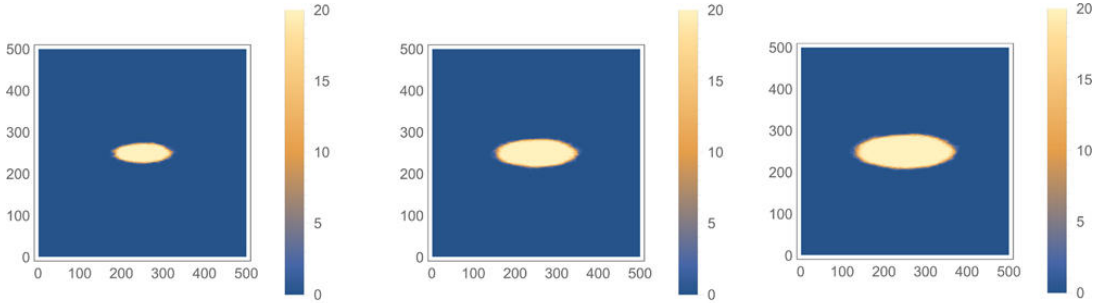
We propose an anisotropic stochastic growth model to rationalize the anisotropic self-assembly of supramolecules to form elongated two-dimensional ribbon structures in a recent experiment. The model exhibits distinct growth scenarios that are critically controlled by the ratio of the transverse and the longitudinal growth rate. In the regime of suppressed transverse growth, the model generates the experimentally observed elongated structures through layer-by-layer growing. We further observe the convergence of rough clusters toward smooth regular elliptic patterns by averaging over a number of independent growth processes. Remarkably, these resulting elliptic clusters are self-similar in each instantaneous moment in the growth process. Statistical analysis suggests that the realization of such ordered patterns does not rely on the delicate coordination of different parts in the cluster growth.



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