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Structures Formed by Front Induced Phase-Separation ERIC FOARD, ALEXANDER WAGNER, North Dakota State University — The controlled creation of structure in bulk is vital for the production of materials such as photonic crystals, immersion precipitation membranes, etc., which are of keen engineering and scientific interest. We show that phase separation fronts moving through binary mixtures can leave in their wake structures which are remarkably highly ordered. We present a model for phase separation fronts that produces a rich family of morphologies from a very small set of parameters. For some morphologies we are able to analytically determine how the structure depends on these parameters. We compare these analytical predictions to numerical simulations performed using the lattice Boltzmann method. We demonstrate how the ability to successfully predict structure formation allows for controlled production of complex, depth-dependent, ordered materials.

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