

Title: Patterns and their order parameters.

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Abstract: Natural patterns turn up all over the place in nature and in the laboratory. They arise in systems driven far from equilibrium by some external stress when some uniform state becomes unstable (think of the conducting state in a horizontal layer of fluid heated from below) to some other less uniform state with less symmetries (e.g. convecting rolls). At the phase transition, some shapes and configurations are preferentially amplified. They grow and interact until a new winner emerges. But, because of various restrictions, the new state may not be a pure state of the winning planform (e.g. convecting rolls all parallel to each other) but rather consist of patches of the winning planform that meet and meld along line and point defects (think of the patterns on the tips of your fingers). This talk will be about how one might go about describing the new state in terms of macroscopic coordinates called order parameters and about the universal features they display and equations they satisfy. Lots of open questions!