

PATTERN FORMATION

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Simple dynamic systems often develop surprisingly complex patterns when their symmetry is broken. The study of pattern formation, both experimentally and theoretically, has become a major effort in recent years, largely because of the observation that similar features are often seen in completely different systems. The availability of fast computers to simulate pattern-forming scenarios has also contributed to the popularity of the subject. We shall demonstrate a selection of the most common pattern-forming systems: the Rayleigh instability in water jets, viscous fingering in thin fluid layers, segregation in granular mixtures, atmospheric cloud patterns, dendritic growth of crystals. We shall also introduce a new system which we have been investigating, a thin water layer drying from a clean mica substrate, which is capable of mimicing many of the above phenomena, depending on its rate of evaporation. This system also provides patterns which can be accurately compared to computer simulations.