Most macroscopic measurements yield integrals of the quantities of interest and as such rely on certain assumptions regarding the spatial distribution of those quantities. For example, the magnetic moment is the integral of the magnetic induction over the sample volume. It may not only be position-dependent, but also a non-analytic function of the position. In such systems with complex patterns one cannot use energy minimization to determine which topology corresponds to the ground state [1]. As a consequence, various nontrivial phenomena, such as topological hysteresis [1], suprafroth [2] and topological time-reversal symmetry breaking may be observed. I will present direct time-resolved magneto-optical imaging of magnetic patterns in ferromagnets and superconductors and show that some well-established theories, such as Landau's theory of the intermediate state, have to be revised. Furthermore, magnetic patterns may be used as model systems to study, for example, the physics of froths [2].