This talk will survey a family of problems in which one seeks to prove that, for a complex-valued function, energy concentrates around a codimension 2 submanifold solving a geometric problem. The equations in question arise from physical models, and the energy concentration sets are often naturally interpreted as “quantized vortex filaments”. One can hope to describe these vortex filaments in a variety of types of PDE, including elliptic (describing an equilibrium of a physical system), parabolic (often describing flow toward equilibrium) and hyperbolic or dispersive (describing different kinds of oscillations and wave propagation). There are a large number of results about elliptic and parabolic equations, although some significant problems remain open, and less is known about hyperbolic and (especially) dispersive equations.