Turbulence is a general phenomenon which appears in situations where an energy flux goes from large to small spatial scales where finally the energy is dissipated. This is realized, e.g., in the cascade of eddies breaking up in smaller and smaller eddies. As a result the number of particles with a particular momentum follows a power law in momentum with a universal critical exponent. The situation can be described as a dynamical critical phenomenon far from thermal equilibrium. Besides universal power laws it contains further reminiscence of systems at a phase transition in equilibrium, such as slowing down of the evolution near the critical point. I will give an introduction to such phenomena and report on recent results how they appear in ultracold Bose gases below the normal to superfluid transition. The results shed light on fundamental aspects of superfluid turbulence and have strong potential implications for related phenomena, e.g., quark-gluon plasma dynamics or early-universe inflation.