

The theory of wave turbulence can be traced back to the 1920s and has played significant roles in many different areas of physics. However, for a long time the mathematical foundation of the theory has not been established. The central topics here are the wave kinetic equation, which describes the thermodynamic limit of interacting wave systems, and the propagation of chaos, which is a fundamental physical assumption in this field that lacks mathematical justification. In this talk, I will present recent results with Zaher Hani (University of Michigan), where we provide the first rigorous derivation of the wave kinetic equation, and also justify the propagation of chaos assumption in the same setting.