

The recent discovery of gravitational waves from a binary neutron star merger and its accompanying electromagnetic counterparts was a watershed moment in the history of physics and astrophysics and marked the beginning of multimessenger astronomy including gravitational waves. In this series of lectures, I will discuss the theoretical concepts we use to describe such electromagnetic counterparts and to infer source properties. I will discuss both non-thermal and thermal transients, including theory of short gamma-ray bursts and their afterglows as well as theory of kilonovae and related aspects of r-process nucleosynthesis. Although the field is expected to evolve rapidly, thanks to new observational discoveries and theoretical advances, the methods discussed here will still form the foundation of our understanding for many years to come.