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Lecture 1.

**Quasi-Periodic Brightness Oscillations from Accreting
Neutron Stars and Black Holes**

The fast timing capability of the Rossi X-ray Timing Explorer has revealed a number of characteristic frequencies of variation in the X-ray emission from accreting neutron stars and black holes. These frequencies are large enough that they must be affected by the strongly curved spacetime near these compact objects. As a result, study of them has the potential to probe strong gravity, and may also constrain the state of dense matter in neutron stars. I will discuss the phenomenology of these oscillations as well as current ideas about their causes and implications.

Lecture 2.

Sources of Gravitational Radiation

Multiple groups around the world are designing instruments to detect gravitational radiation. The first detections are expected with ground-based instruments at the end of this decade, with observations by space-based interferometers following a few years later. The extreme weakness of gravitational waves means that detection of them requires some advance understanding of the likely sources. I will discuss examples of sources in each of the major categories of emitters (binary inspiral, continuous-wave, burst, and stochastic), and will identify ways in which modeling of these sources can aid in the detection effort.