Detecting Low-Frequency Gravitational Waves with Pulsar Timing Arrays

Pulsar timing arrays (PTAs) detect low-frequency gravitational waves (GWs) by looking for correlations in the timing residuals of a collection of millisecond pulsars. The most promising sources in this regime are supermassive black hole binaries (SMBHBs), which form in galaxy mergers. PTAs are sensitive to both individual SMBHBs and a stochastic background produced by the superposition of a cosmological population of SMBHBs.

I will discuss detection techniques used by PTAs and present current limits on the strength of GWs in the PTA band from work by the North American Nanohertz Observatory for Gravitational Waves (NANOGrav) collaboration.