Pulsar Timing Arrays: Building a Low-Frequency Gravitational Wave Detector
MAURA MCLAUGHLIN, West Virginia University

Pulsars are rapidly rotating neutron stars with phenomenal rotational stability that can be used as celestial clocks in a variety of fundamental physics experiments. One of these experiments involves using a “pulsar timing array” of precisely timed millisecond pulsars to detect perturbations due to gravitational waves. The low-frequency gravitational waves detectable through pulsartiming will most likely result from an ensemble of supermassive black hole binaries. I will introduce the efforts of the North American Nanohertz Observatory for Gravitational Waves (NANOGrav), a collaboration which monitors an array of over 70 millisecond pulsars with the Green Bank Telescope and Arecibo Observatory, with a focus on our observation and data analysis methods. I will also describe how NANOGrav works with international partners through the International Pulsar Timing Array to build a low-frequency gravitational wave detector of higher sensitivity than any one pulsar timing array.