

Gravitational Wave Astronomy with a Next-Generation Pulsar Timing Array Detector

The North American Nanohertz Observatory for Gravitational Waves (NANOGrav) collaboration is working towards the detection and study of low-frequency gravitational waves (GWs) using an array of rapidly rotating, highly stable radio pulsars distributed across the galaxy. Each pulsar emits a radio beam that passes our line of sight and is observed as regular, pulsed emission.

We measure the times of arrival of pulses and compare with a model that includes: the rotational motion of the pulsar, orbital motions, and interstellar propagation delays; random timing noise from pulsars themselves and from the interstellar medium; and a correlated GW signal. Typical GW sources in this frequency band are supermassive black hole binaries at the centers of merging galaxies. Recent GW upper limits have placed strong astrophysical constraints on galaxy formation history and merger models.

I will highlight areas of work being done by the NANOGrav collaboration, including my research on achieving the highest levels of precision timing possible.

**Department of Physics
University of Vermont**

**Theoretical and
Applied Physics**

Fall 2018

**Dr. Michael Lam
Department of Physics
and Astronomy
West Virginia University**

Wednesday, September 26

4:00 PM

Davis Center

Mildred Livak Room 419

Refreshments will be available at

3:30 PM.

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