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Pulsar Timing Arrays See Red: The Era of Low-Frequency Gravitational Wave Detection

Millisecond pulsars are rapidly rotating neutron stars with phenomenal rotational stability. Pulsar timing arrays world-wide monitor over 100 of these cosmic clocks in order to detect perturbations due to gravitational waves at nanohertz frequencies. These gravitational waves will most likely result from an ensemble of supermassive black hole binaries. Their detection and subsequent study will offer unique insights into galaxy growth and evolution over cosmic time. I will present the most recent results from the North American NANOGrav and International Pulsar Timing Array collaboration datasets, including a common "red" spectral signature in the data that could be the first hints of gravitational waves. I will then describe the gains in sensitivity that are expected from additional data, discoveries of millisecond pulsars, more sensitive instrumentation, and international collaboration.

Maura McLaughlin

West Virginia University, USA

Professor Maura McLaughlin is Eberly Family Distinguished Professor and Director of the Center for Gravitational Waves and Cosmology at the West Virginia University, USA. Her main research interests involve studying neutron stars and their environments through radio, X-ray and gamma-ray observations. Professor McLaughlin plays a leading role in the North American Nanohertz Observatory for Gravitational Waves (NANOGrav) which aims to detect gravitational waves by timing an array of millisecond pulsars. She has been awarded an Alfred P. Sloan Fellowship, a Cottrell Scholar Award from the Research Corporation for her work, and an APS Fellowship in 2021.

3:30 PM, 30 Jan 2023

Zoom link: shorturl.at/QSU89

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Madhava Lecture Hall, ICTS, Bengaluru