**Idaho State University
Physics Colloquium**

**Searching for Nanohertz Gravitational Waves with a Galactic-Scale Detector**

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Pulsar timing arrays open a new band of the gravitational wave spectrum by building a galactic-scale GW detector. They will detect a stochastic background of gravitational waves in the next few years. The strongest signal is expected to be the unresolvable background from supermassive black hole binaries at the centers of merged galaxies. While SMBBHs are expected to be the strongest source of GWs, we are sensitive to any GW signal in the nanohertz regime. The North American Nanohertz Observatory for Gravitational Waves (NANOGrav) is an NSF funded Physics Frontiers Center monitoring over 70 millisecond pulsars for the signature of these gravitational waves. In the NANOGrav 12.5-year dataset we are seeing significant evidence for a signal in our data that is common among many of the pulsars. We currently find no definitive evidence for the correlated pattern that is indicative of gravitational waves, however, if we are seeing the first signs of the GW background our models show that continued observations will lead to a detection within the next few years.

**Monday, October 25 2021
Via Zoom (**[**https://isu.zoom.us/j/89095871939**](https://isu.zoom.us/j/89095871939)**)
4:00 – 4:50 pm**