

T 1: Invited Overview Talks 1

Time: Monday 14:45–15:15

Location: Geb. 30.95: Audimax

Invited Overview Talk T 1.1 Mon 14:45 Geb. 30.95:
Audimax

Evidence for a gravitational-wave background at nanohertz frequencies — ●KAI SCHMITZ — University of Münster, Münster, Germany

Pulsar timing arrays (PTAs) are gravitational-wave (GW) detectors of galactic dimensions that search for GWs with light-year wavelength washing through the Milky Way by monitoring arrays of pulsars, highly magnetized fast-spinning neutron stars that act like cosmic lighthouses, over time spans of years and decades. In this overview talk, I will review the 2023 results from PTA collaborations around the globe, which point to the existence of a GW background (GWB) hum permeating

our Universe. Indeed, the tell-tale sign of a stochastic GWB signal is a characteristic cross-correlation pattern in the timing data for pairs of pulsars, the so-called Hellings-Downs curve, which is now seen for the first time at different levels of statistical significance in the latest PTA data sets. I will discuss the most likely explanation of this signal, namely, a cosmic population of inspiraling supermassive black-holes binaries at the centers of galaxies, but also highlight exotic sources powered by new particle physics in the early Universe, such as cosmic inflation, phase transitions, and cosmic strings. Finally, I will conclude with a brief outlook on the future of the field, in particular, upcoming measurements that may help in discriminating between a GWB signal of astrophysical origin and a GWB signal from the Big Bang.