

# Allgemeines Physikalisches Kolloquium

Donnerstag, 22.05.25 – 16 Uhr c.t.

*IG1 – HS 2 | Wilhelm-Klemm-Str. 10*

Kolloquiums-Kaffee ab 16 Uhr vor dem Hörsaal

## Prof. Dr. Bruce Allen

Max Planck Institute for Gravitational Physics (Hannover)



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### **Pulsar timing arrays and the detection of low-frequency gravitational waves**

Pulsar timing arrays (PTAs) detect gravitational waves (GWs) via the correlations they create in the arrival times of pulses from different pulsars. The mean correlation, a function of the angle between the directions to pulsars, is called the Hellings and Downs (HD) curve. Observation of this pattern is key evidence that the timing residuals arise from GWs, so PTAs “reconstruct the HD curve” by estimating the inter-pulsar correlation using pulsar pairs separated by similar angles. I'll talk about how PTAs work, and about a recent paper with Joe Romano (PRL 134, 031401, 2025) where we examine the reasons why the HD reconstruction differs from the mean, and estimate the variance. I'll also talk about some work in progress, to extend this to a harmonic space description.