

# Whispers from the Dark Universe - Particles & Fields in the Gravitational Wave Era

CLUSTER OF EXCELLENCE  
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DESY THEORY WORKSHOP

## WHISPERS FROM THE DARK UNIVERSE – PARTICLES & FIELDS IN THE GRAVITATIONAL WAVE ERA

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## Probing primordial black hole mergers with PTAs

*Wednesday 25 September 2024 17:50 (16 minutes)*

In this talk, I will discuss how pulsar timing arrays (PTA) can probe primordial black holes (PBH) through gravitational waves. If PBHs exist, they can form in the early universe from the collapse of large density perturbations, necessarily triggering a background of secondary-order scalar-induced gravitational waves. In the late universe, these PBHs will form clusters, leading to enhanced PBH binary merger rates that can also contribute to a gravitational wave background. Additionally, I will discuss the parameter space favored by the latest PTA data release for this model and its physical implications.

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