



Colloquium

Targeted Searches for Supermassive Black Hole Binaries

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Pulsar timing arrays have opened a new observational window onto nanohertz gravitational waves, providing evidence for a gravitational wave background and motivating the search for the individual supermassive black hole binaries that generate it. In this talk, I will present the first catalog of electromagnetically informed targeted searches using the NANOGrav 15 year data set, focusing on 114 active galactic nuclei with observed periodicity or other indications of binarity. By incorporating source specific information such as sky position, distance, redshift, and an estimated gravitational wave frequency, our limits on strain and chirp mass are improved on average 2.6x compared to all sky analyses. I will describe the methodological framework that enables these gains, summarize the catalog level results, and discuss how these searches connect to population models, electromagnetic follow-up, and current measurements of the gravitational wave background. The tests outlined here create a path toward the first detection of an individual supermassive black hole binary with pulsar timing arrays.

Monday, December 1, 2025 11:30am - 12:30pm

Raiffeisen Lecture Hall



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station. Please find a schedule of the ISTA Shuttle on our webpage: <https://ista.ac.at/en/campus/how-to-get-here/> The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.