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Studying eccentric supermassive black hole binaries in PTA

Thursday, November 20, 2025 11:00 AM (15 minutes)

The most plausible astrophysical sources for PTA experiments are supermassive black hole binaries (SMBHBs), which emit gravitational waves (GWs) that incoherently superpose to form a stochastic GW background (SGWB). Particularly massive and nearby SMBHBs produce strong signals that may stand out above the GWB. PTAs will observe the early inspiral of these systems at large orbital separations, where the orbits may have significant eccentricity.
In this talk, I will present the results of parameter estimation performed using a gravitational waveform model based on the Effective-One-Body (EOB) approach applied to individually resolvable binaries. I will focus on relevant binaries for an EPTA-like mock dataset, spanning the parameter space in eccentricity, chirp mass, and orbital frequency for various signal-to-noise ratio (SNR) values.
Furthermore, since the template includes high post-Newtonian (PN) order corrections, which depend explicitly on the total mass of the binary, I will investigate the possibility of disentangling the two component masses for relativistic systems in the high-frequency region of the PTA band.

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