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## Studying eccentric supermassive black hole binaries in PTA

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Pulsar Timing Array (PTA) observations are carried out to search for gravitational waves (GWs) in the nano-Hertz band. The most plausible source is the population of supermassive black hole binaries emitting GWs that incoherently superpose and form a stochastic GW background (SGWB). In addition, particularly massive and nearby SMBHBs produce strong signals that may stand out above the GWB and be individually resolvable. PTAs will see the early inspiral of these systems observed at large orbital separations, where the orbital evolution may be strongly influenced by dynamical interactions with the environment, through which SMBHBs may retain a significant eccentricity.

In this poster, I will present a gravitational waveform model based on the Effective-One-Body (EOB) approach. We use it to search for eccentric binaries in the data collected by EPTA collaboration. We verify the efficiency of the search and its limitations using simulated PTA data.

In particular, we focus on disentangling a continuous GW signal from a binary from SGWB. Evaluating our ability to detect and correctly characterise eccentric binaries is an essential step in analysing and interpreting results based on EPTA and IPTA data, which, in turn, impacts our understanding of the properties of the SMBH population in the local Universe.

### Speaker information

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