

General Relativity and Quantum Cosmology

The search for spinning black hole binaries in mock LISA data using a genetic algorithm

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Coalescing massive Black Hole binaries are the strongest and probably the most important gravitational wave sources in the LISA band. The spin and orbital precessions bring complexity in the waveform and make the likelihood surface richer in structure as compared to the non-spinning case. We introduce an extended multimodal genetic algorithm which utilizes the properties of the signal and the detector response function to analyze the data from the third round of mock LISA data challenge (MLDC 3.2). The performance of this method is comparable, if not better, to already existing algorithms. We have found all five sources present in MLDC 3.2 and recovered the coalescence time, chirp mass, mass ratio and sky location with reasonable accuracy. As for the orbital angular momentum and two spins of the Black Holes, we have found a large number of widely separated modes in the parameter space with similar maximum likelihood values.

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