

Progress towards a semi-coherent search for EMRI signals

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The search for extreme mass ratio inspiral (EMRI) event signatures in the LISA data-stream necessitated new data analysis strategies to search for and to characterise EMRIs in parameter space. While elements of EMRI data analysis have been demonstrated before, they have typically involved simplifying assumptions and have tended to separate the ‘search’ and ‘characterisation’ parts of the analysis. The end-to-end analysis of EMRI signals remains a major open problem. We present some preliminary results using a semi-coherent likelihood to search for stellar mass binary black hole inspirals in LISA, which are a good analogue for EMRI signals from the perspective of data analysis. We show with a sufficiently high number of segments a stellar mass binary black hole signal can be localised from reasonably wide priors on the chirp mass and time of merger. A variant of particle swarm optimisation is also demonstrated as a solution to the problem of parameter degeneracy in the likelihood surface for EMRI signals.

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