

1 Authors

Antoni Ramos Buades, Sascha Husa, Geraint Pratten

2 Affiliations

University of the Balearic Islands

3 Title

A catalog of numerical relativity and hybrid waveforms of eccentric black-hole binary systems

4 Abstract

Population synthesis studies show that globular clusters and galactic nuclei may host a population of moderate and high eccentric black-hole binaries emitting gravitational waves in the frequency band of ground-based detectors. The production of gravitational waveform models describing such systems requires calibration to numerical relativity simulations. In this talk, we present a catalog of numerical eccentricity simulations and hybrid waveforms connecting these simulations to post-Newtonian results. We discuss our workflow to generate these data, from prescribing a desired initial eccentricity, carrying out the simulations with an acceptable accuracy for waveform modelling with two available codes [1], BAM and EinsteinToolkit, to constructing the hybrid waveforms [2]. Finally, we discuss open challenges in the post-Newtonian prescription and in numerical simulations, as relevant for the waveform modelling for spinning highly eccentric binaries.

5 References

- 1) Ramos-Buades, Antoni and Husa, Sascha and Pratten, Geraint. Phys. Rev. D99, 2, 023003 (2019). *Simple procedures to reduce eccentricity of binary black hole simulations*.
<https://link.aps.org/doi/10.1103/PhysRevD.99.023003>
- 2) Ramos-Buades, Antoni and Husa, Sascha and Pratten, Geraint in preparation.