

The BlackHoles@Home Project: Black Hole Binaries on the Desktop Computer

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Current numerical relativity (NR) gravitational waveform catalogs sample the 7-dimensional black-hole binary parameter space extremely sparsely, and will need to be expanded by orders of magnitude to maximize the science from upcoming gravitational wave detectors. We report on BlackHoles@Home, a proposed SETI@Home-like project that focuses on generating NR-based black hole binary waveform catalogs and follow-ups at unprecedentedly large scales. Through our recent extensions of the BSSN-in-spherical-coordinates reference metric formulation to comoving, bispherical-like numerical grids, the project aims to reduce the cost of numerical relativistic black hole and neutron star binary simulations by $\sim 100x$. With this cost savings, state-of-the-art black hole binary merger simulations may be performed entirely on a consumer-grade computer, enabling the general public to participate directly in this critical science.

References

BlackHoles@Home home page: <https://blackholesathome.net>

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