

Abstract Submitted
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Data-driven modeling of peak luminosity of black hole mergers

AFURA TAYLOR, Massachusetts Institute of Technology MIT, VIJAY VARMA, California Institute of Technology — During the final moments of LIGO’s first detection, more power was radiated than the power radiated in light from all the stars and galaxies in the Universe combined! This remarkable claim is based on models that predict the luminosity of a black hole merger. Current models for the peak luminosity follow a phenomenological approach, which involves making some assumptions based on perturbation theory and intuition and then calibrating free parameters to numerical relativity simulations. In this work, we take a more powerful approach and train our model directly against numerical relativity simulations, without any underlying phenomenological assumptions. We develop a purely data-driven model for the peak luminosity using Gaussian Process Regression and show that our model outperforms existing models by at least an order of magnitude.

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