Abstract Submitted
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Surrogate models of gravitational waveforms from numerical relativity simulations of precessing binary black hole mergers JONATHAN BLACKMAN, Caltech, SCOTT FIELD, Cornell, CHAD GALLEY, DANIEL HEMBERGER, MARK SCHEEL, PATRICIA SCHMIDT, RORY SMITH, Caltech — Extracting astrophysical parameters and testing general relativity from gravitational wave observations of binary black hole mergers requires high-fidelity signal predictions. The effective-one-body model and phenomenological waveform models have been shown to work well for a subset of the possible parameter space. They could be insufficiently accurate for estimating the parameters of a loud gravitational wave detection in other regions of the parameter space. Numerical relativity (NR) surrogate models attempt to rapidly and accurately interpolate the waveforms from a set of NR simulations over a subset of parameter space. Using the Spectral Einstein Code (SpEC), we have built NR surrogate models for precessing binaries with a restricted spin direction on the smaller black hole, and are actively working on extending this to the full 7d parameter space of non-eccentric binaries. The NR surrogate models typically perform an order of magnitude better than other waveform models when compared to NR waveforms which were not included in the surrogate training set, and can be used in gravitational wave parameter estimation.

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